

1

**Impact Area Review Team  
Massachusetts Military Reservation  
Building 330  
March 8, 2000  
6:30 PM**

**Meeting Minutes**

<b><u>Member:</u></b>	<b><u>Organization:</u></b>	<b><u>Telephone:</u></b>	<b><u>E-Mail:</u></b>
Ben Gregson	MAARNG/IAGWS	508-968-5821	<a href="mailto:mmreis@pop.tiac.net">mmreis@pop.tiac.net</a>
LTC Joe Knott	NGB-ARE	703-607-7971	<a href="mailto:knottj@ngb.arng.ngb.army.mil">knottj@ngb.arng.ngb.army.mil</a>
LTC Bill Fitzpatrick	MAARNG/IAGWS	508-968-5822	<a href="mailto:fitzpatrick@neaccess.net">fitzpatrick@neaccess.net</a>
Shaun Cody	MAARNG	508-233-6520	
Bill Walsh-Rogalski	US EPA	617-918-1035	
Margery Adams	US EPA	617-918-1358	<a href="mailto:adams.margery@epa.gov">adams.margery@epa.gov</a>
Todd Borci	US EPA	617-918-1358	<a href="mailto:borci.todd@epa.gov">borci.todd@epa.gov</a>
Jan Drake	MA DEP	508-946-2841	<a href="mailto:janice.drake@state.ma.us">janice.drake@state.ma.us</a>
Marty Aker	AFCEE/MMR	508-968-4670	<a href="mailto:marty.aker@mmr.brooks.af.mil">marty.aker@mmr.brooks.af.mil</a>
Kent Gonser	MMR/JPO	508-968-5824	<a href="mailto:kent.gonser@mmr.brooks.af.mil">kent.gonser@mmr.brooks.af.mil</a>
Marc Grant	Ogden Environmental	978-692-9090	<a href="mailto:magrant@oees.com">magrant@oees.com</a>
Joel Feigenbaum	ABC/JPAT	508-833-0144	<a href="mailto:joelf@cape.com">joelf@cape.com</a>
Richard Hugus	Citizen		<a href="mailto:rhugus@cape.com">rhugus@cape.com</a>
Dick Prince	LRWS PAT	508-759-3449	
Ray Taylor	JPAT	508-539-1709	<a href="mailto:raydtaylor@aol.com">raydtaylor@aol.com</a>
Peter Schlesinger	Citizen	508-540-9900	<a href="mailto:pschles@whrc.org">pschles@whrc.org</a>
Paul Zanis	Citizen	508-539-2852	<a href="mailto:zap59@aol.com">zap59@aol.com</a>
Tom Cambareri	LRWS	508-362-3828	<a href="mailto:water@cape.com">water@cape.com</a>
Charles Harvey	MIT	978-369-0865	<a href="mailto:charvey@mit.edu">charvey@mit.edu</a>
Kate Dannan	TOSC	978-596-5857	<a href="mailto:dannan@adm.njit.edu">dannan@adm.njit.edu</a>
Patricia Culligan	MIT	617-258-7093	<a href="mailto:trisha@mit.edu">trisha@mit.edu</a>
Jim Stahl		508-255-5537	<a href="mailto:jim.stahl@bigfoot.com">jim.stahl@bigfoot.com</a>

<b><u>Facilitator:</u></b>	<b><u>Organization:</u></b>	<b><u>Telephone:</u></b>	<b><u>E-Mail:</u></b>
Austine Frawley	US EPA	617-918-1065	<a href="mailto:frawley.austine@epa.gov">frawley.austine@epa.gov</a>

<b><u>Attendees:</u></b>	<b><u>Organization:</u></b>	<b><u>Telephone:</u></b>	<b><u>E-Mail:</u></b>
Jan Larkin	JPO	508-968-5824	<a href="mailto:jan.larkin@mmr.brooks.af.mil">jan.larkin@mmr.brooks.af.mil</a>
COL Richard Freeman	JPO	508-968-5908	<a href="mailto:richard.freeman@mmr.brooks.af.mil">richard.freeman@mmr.brooks.af.mil</a>
Len Pinaud	MA DEP	508-946-2871	<a href="mailto:leonard.pinaud@state.ma.us">leonard.pinaud@state.ma.us</a>
Doug Shattuck	Envirogen	781-821-5560	<a href="mailto:shattuck@envirogen.com">shattuck@envirogen.com</a>
Dave Egan	IT Corp	781-769-7600 x 238	<a href="mailto:degan@theitgroup.com">degan@theitgroup.com</a>
Jeff Burt	Cape Cod Times	508-548-9300	
Jay Clausen	Ogden	978-692-9090	

<u>Attendees (con'd.):</u>	<u>Organization:</u>	<u>Telephone:</u>	<u>E-Mail:</u>
Jim Murphy	EPA		
Kristin Smith	ETC	508-563-3648	
Eric Banks	JEG	508-569-5746	<a href="mailto:eric.banks@jacobs.com">eric.banks@jacobs.com</a>
Mary O'Reilly	JEG	508-564-5746	<a href="mailto:mary.oreilly@jacobs.com">mary.oreilly@jacobs.com</a>
Kim Harriz	Ogden		
Katherine Zone	MDPH	508-968-4364	
Virginia Valiela	Falmouth Selectman		
David Jacobson	MAARNG	508-968-5834	
CPT William Myer	NGB		
Don Walter	USGS	508-490-5050	<a href="mailto:dawalter@usgs.gov">dawalter@usgs.gov</a>
Ellen Oliver	Ogden	978-692-9090	<a href="mailto:ejoliver@oes.com">ejoliver@oes.com</a>
Kristin Keske	Envirogen	781-821-5560	<a href="mailto:keske@envirogen.com">keske@envirogen.com</a>
Doug Larson	Envirogen	781-821-5560	<a href="mailto:l Larson@envirogen.com">larson@envirogen.com</a>
L.H. Brice	Bescorp.	907-452-2512	<a href="mailto:Albrice@briceinc.com">Albrice@briceinc.com</a>
Darrell Deleppo	US ACE	928-318-8348	
David Dow	Sierra Club	508-540-7142	
William Gallagher	Ogden	508-563-9428	
Cheryl K. Chapman	Matrix	605-399-2000	
Jason Alves	JPO	508-968-5824	
Charles Rives	JEG	508-564-6192	<a href="mailto:charles.rives@jacobs.com">charles.rives@jacobs.com</a>
Scott Michaud	CCC	508-362-3828	<a href="mailto:water@cape.com">water@cape.com</a>
Mark Applebee	Ogden	978-692-9090	<a href="mailto:mrapplebee@oes.com">mrapplebee@oes.com</a>
Scott C. Veenstra	Ogden	336-591-9853	<a href="mailto:Scveenstra@mindspring.com">Scveenstra@mindspring.com</a>
John Rice	Ogden	978-692-9090	<a href="mailto:Jfrice@oes.com">Jfrice@oes.com</a>
Mary Meli	OpTech	508-563-0199	<a href="mailto:mmeli@otcorp.com">mmeli@otcorp.com</a>
Janet Cenedella	OpTech	508-563-0199	<a href="mailto:jcenedel@otcorp.com">jcenedel@otcorp.com</a>

**Agenda Item #1. Welcome, Introductions, Review Action Items, and Approval of the February 3, 2000 Meeting Minutes.**

Ms. Frawley convened the meeting at 6:32 PM. She then reviewed the action items.

***Review of Action Items***

1. The JPO will request that Jacobs Engineering present and discuss, at the March IART meeting, the selection of well locations for the JPO's Upper Cape Water Supply Program, including modeling efforts for Impact Area plumes, contaminants and ZOCs.

Ms. Frawley reported that Jacobs Engineering was at the meeting this evening to discuss and present the JPO's Upper Cape Water Supply modeling effort. She reported that Mr. Gonser had requested that this presentation be the last agenda item, as one Jacobs person was en route from Boston.

2. OpTech will send Mr. Richard Judge, Sandwich Selectman, a copy of the February 3, 2000 meeting minutes.

Ms. Frawley reported that this had been done.

3. **Mr. P. Goddard, citizen, asked that EPA take under advisement a request that the Public Involvement Plan being developed under AO #3 be put out for public comment.**

Ms. Frawley reported that this will be done.

4. **MA ARNG agreed to provide a written update on the status of the October 8, 1999 Ammo Supply Point (ASP) Inventory, including what is currently held on-site and what has been shipped off-site, and to distribute the update to the IART in the next Weekly Report.**

Ms. Frawley reported that LTC Fitzpatrick would give a brief summary of the ASP Inventory update and that the update was in the February 7, 2000 meeting notes.

LTC Fitzpatrick stated that currently all 155 millimeter (mm) and 105mm munitions, the 81 and 60mm artillery simulators and hand grenade simulators had been shipped. He said that 81 and 60mm illumination rounds and anti-tank mines were palletized and ready to go.

Mr. Hugus asked if LTC Fitzpatrick could give the team some idea of what the quantities of the munitions were. LTC Fitzpatrick replied that he did not have that information and stated that he thought most of the people at the table got a copy of the ASP inventory that had been prepared in late Fall of 1999. He said that whatever is on there for those rounds, that is what has been shipped out. Mr. Hugus asked what was left in the ASP. LTC Fitzpatrick said he would give the actual count to Mr. Borci at next week's technical meeting and that Mr. Borci could relay the information. Mr. Hugus asked Mr. Borci to give some idea of what is left in the ASP, as he considers this summary to be extremely vague. Mr. Borci said he could do that. LTC Fitzpatrick said he would have all the information for Mr. Borci tomorrow. Mr. Schlesinger asked if there were other items waiting to be palletized, or is what is palletized the last of the munitions to be shipped. LTC Fitzpatrick said yes, that as he understands it, what is still in there is only small arms and pyrotechnics, smokes and flares, or what they need for safety in case there is a medical emergency.

Mr. Hugus commented that the ASP inventory would be discussed at the next technical meeting and he wondered if the IART could get a copy of the revised inventory - what remains in the ASP. LTC Fitzpatrick said he would check with the state.

5. **Mr. Schlesinger requested that a legible copy of the 1985 report (Propellant Combustion Product Analysis on an M-16 Rifle and a 105mm Caliber Gun) be obtained and distributed to the IART.**

Ms. Frawley reported that this item was included the IART handouts this evening.

6. **Mr. Hugus requested that it be taken under consideration that the M-16 Range, located off Greenway Road, be included in the Small Arms Sampling Plan.**

Ms. Frawley noted that this had been taken under advisement. LTC Knott said that a plan was given to the EPA for some ranges to sample, and he thought the Greenway Road range was included in that sampling plan. Both Mr. Hugus and Dr. Feigenbaum had requested that NGB use or test a range which had just received live fire. LTC Fitzpatrick said he had no problem getting input to Mr. Borci and was agreeable to swapping out or adding Greenway Road as one of the sites to be looked at. He added that he thought the most important objective was to meet the requirement that testing be conducted on a range immediately after live firing.

Mr. Borci said that he thinks the point in the plan NGB gave to EPA was that they picked out the three high-use areas. If one of those high-use areas is swapped out with one of the ranges on Greenway Road, which the NGB has gotten away from using because of noise complaints and other things over the last few years, he thought we would be trading down and basically getting a less-used range.

Mr. Hugus asked how many ranges there are along Greenway Road. Mr. Zanis replied that there were five or six. LTC Knott said he did not know but could get a picture of where each range is, what it is called, and what it is used for. Mr. Hugus questioned whether any of the five or six ranges are high-use ranges. LTC Knott said that, as he had discussed with Ms. Frawley earlier, he had received an e-mail from COL Bailey, the commander at the base, regarding Mr. Zanis' request. He said he did not want to misquote COL Bailey and that is why he would rather include the information in a mailing to the IART members next week, but he was almost positive that the e-mail said that those ranges had not been used since October 1996. He again said the e-mail stated it had been a couple of years since most all of those ranges had been fired on.

Mr. Hugus commented to Ms. Frawley that, during the past week, he had asked if the subject of moving the small-arms firing ranges on Greenway Road away from the residential areas could be placed on the agenda. He asked if there were space on the agenda for this later or if it could be discussed now. Ms. Frawley replied that it could be discussed now. LTC Knott said he thinks it falls into the same point of view of those who don't want those ranges used because of their closeness to a residential area. He stated those are important ranges that the Commander said were not being used anymore and were not planned to be used in the future based on noise complaints and other reasons. LTC Knott reiterated that he did not want to misquote COL Bailey, and he would provide the team with exactly what COL Bailey had said. LTC Knott said that the main point was that there was no concern; the concern previously voiced is being taken care of, as no firing is taking place on those ranges right now and there are no plans in the immediate future to resume firing at those ranges. He reiterated that this information would be provided to members in writing.

Dr. Feigenbaum said he was at the Forestdale School on Saturday, and reported that there was a lot of firing going on. LTC Knott asked where, and Dr. Feigenbaum replied that he did not know where. LTC Knott asked if Dr. Feigenbaum were saying that there was firing on Greenway Road. Dr. Feigenbaum said that he was not telling him that, just that he was at the Forestdale School and could hear there was a lot of firing. He said he doesn't know where it was, but that whatever range it was would be a good range to use for the sampling. LTC Knott said that that was not Mr. Hugus' question, and that he had no problem using whatever range, but that he thought Mr. Hugus' question was what ranges were NOT going to be used.

Dr. Feigenbaum stated that his second question was who was there this weekend. LTC Knott said that he could obtain the information from LTC Bailey on what unit trained here and which unit had small-arms firing this weekend. He said that the information would be provided in a mailing to the IART, and Dr. Feigenbaum said that would be fine.

Mr. Hugus said that he agreed with Mr. Borci that in this case it would be better to stick with the high-use and recent-use ranges for soil sampling.

7. **Mr. Zanis requested that the schedule and extent of range maintenance be investigated and reported for consideration when reviewing the small gun ranges sampling plan.**

Ms. Frawley reported that this had been discussed at a technical meeting and asked LTC Fitzpatrick to address the issue. LTC Fitzpatrick stated that he had checked with Range Control and the facility engineers at Camp Edwards. He reported that over the past numerous years, there has been no formal regrading of the firing points at each of the ranges. He explained that, when

there were broken sandbags or whatever, they just took rakes and raked out the soil from the sandbags, but no heavy equipment had gone in and done any regrading at the firing points.

Mr. Hugus said he had a general question about exactly how much unofficial cleanup has been done by the MA ARNG out in the training ranges and the Impact Area. He asked if the MA ARNG had sent people out to do cleanups over the past three years of the IART Study. LTC Knott asked if Mr. Hugus was referring to litter control. Mr. Hugus replied that he was talking about picking up things like C-4 at Demo Area 1, for instance. LTC Knott stated that NGB had gone with Mr. Zanis and that he personally had gone with Mr. Zanis and picked up C-4, at least one time. He also assumed this had occurred on several other occasions. LTC Knott said that he was not aware of Camp Edwards having a formal program where people cleaned up the range, but he could ask LTC Bailey about that. He said he would double-check for the IART, and asked Mr. Hugus to help him narrow down what he was looking for. Mr. Hugus said he was talking about spent rounds, UXO, that sort of thing. LTC Knott said he could guarantee that no one had picked up any UXO, unless they were EOD. He noted that last month some M-16s were fired, and brass was always picked up after shooting—was Mr. Hugus referring to that? Mr. Hugus concurred. LTC Knott stated that the rounds were required to be turned back in and could not be left lying on the range. Perhaps a maintenance plan or SOP for firing rounds would help Mr. Hugus. Mr. Hugus said he imagined it was difficult to get an answer to this because if it had been done, it would have been done without anyone being notified, and maybe not when LTC Knott was here. Mr. Hugus stated that he had seen things out in the Impact Area that have since been cleaned up and he did not know under what program or auspices that was done. LTC Knott said he may be able to check on certain areas to determine if anything had been removed, and Mr. Hugus concurred. LTC Knott said he could do that if Mr. Hugus provided some details. Mr. Hugus commented that LTC Knott had mentioned LTC Bailey. LTC Knott explained that LTC Bailey is the Training Site Commander for Camp Edwards.

8. **It was agreed to discuss, at the next technical meeting, Dr. Feigenbaum's request to include live-fire soil sampling in the small gun ranges sampling plan.**

Ms. Frawley noted that this had been taken under advisement.

9. **Dr. Feigenbaum, Mr. Hugus, and Mr. Taylor requested that options to expand the small source search in the area of MW-78, including installation of wells both upgradient and south of MW-78, be discussed at a technical meeting and the results of that discussion, including next steps, be reported at the next IART meeting.**

Ms. Frawley reported that this had been taken under advisement. Mr. Gregson added that, as a quick update, MA ARNG discussed the potential source areas for the TNT detections in the profile samples in MW78 at the technical meeting. MA ARNG had Ogden and USA Environmental go out and take a look at an area to the south of Demo Area 1, looking for evidence of explosives and munitions, and none were found in this particular area. Mr. Gregson stated that, subsequent to that, MA ARNG has groundwater results from MW-78 which show that the groundwater was non-detect for explosives at all three screens, so, at this point, we will review that information with EPA and MA DEP at the technical meetings and decide if we need to do any further investigation at that particular well location.

10. **It was requested that for IART meetings scheduled during the winter months, both a meeting date and a snow date be set at the end of the IART meeting.**

Ms. Frawley noted this had been done.

Ms. Frawley then introduced and welcomed two new people at the table, Ms. Kate Dannan and Mr. Charles Harvey from the TOSC Program, and asked them to introduce themselves.

Ms. Dannan said that she was from the New Jersey Institute of Technology, which provides technical outreach services to communities with hazardous waste issues and/or hazardous substance issues under their TOSC program. She said that the TOSC currently has a project with the citizen representatives of the IART, and are contracting with MIT and another gentleman, Mr. Jim Stahl, to provide some technical assistance to the citizen members.

Mr. Harvey stated that he was a professor of Environmental Engineering at MIT, and that his specialty was groundwater flow and groundwater contamination.

LTC Knott said that NGB had a new member also. He stated that as part of the NGB's expansion of the cleanup based on the AO #3, they are hiring some more people, and asked CPT. William Myer to introduce himself. CPT Myer stated that he had a bachelor's degree in Earth Science, a master's degree in Planning, and nine years of professional environmental consulting experience.

Ms. Frawley asked if next month TetraTech would be joining the IART. LTC Knott said yes, and that there would be one or two more employees.

#### *Agenda Review*

Ms. Frawley then quickly reviewed the agenda items. She noted that under *Other Issues*, the JPO had asked EPA to address a misunderstanding or clarification on a point at CS-19 that Mr. Borci will present. She asked Mr. Hugus if he were all set with his items, and Mr. Hugus replied yes.

#### *Approval of Minutes*

Mr. Hugus noted that on page 13, second paragraph, the sentence which reads "He read a quote from the January 14, 2000 Enterprise which said....." should be amended to read: "He read a quote from the January 14, 2000 Enterprise in which **the NGB** said..."

Mr. Hugus stated that on page 14, the sentence which reads "Mr. Hugus said that his final point was that LTC Knott's presentation repeatedly called this a unilateral decision, as if he wanted to underscore the fact that there was agreement on it," should read: "Mr. Hugus said that his final point was that LTC Knott's presentation repeatedly called this a unilateral decision, as if he wanted to underscore the fact that there was **no** agreement on it."

Mr. Hugus stated that on page 18, the third paragraph, last sentence which reads "He commented that it is a little bit perverse.....when the EPA has handed down the responsibility to take care of that" be corrected to read: "He commented that it is a little bit perverse....when the EPA has handed **the NGB the responsibility for the public involvement program.**"

Mr. Hugus reported that on page 24, fourth paragraph the word "benzoate-pyrene" should be corrected to read "**benzo(a)pyrene**".

Mr. Pinaud stated that his boss, Millie Garcia-Surette, had attended that February 3, 2000 IART meeting and requested that her name needed to be added to the attendance listing.

Mr. Pinaud reported that on page 11, second paragraph, the sentence reading "...the need for remedial activity under the Massachusetts Contingency Plan (MCP) for the state Superfund law" be corrected to read: "...the need for remedial activity under the Massachusetts Contingency Plan (MCP) **or** the state Superfund law." Mr. Pinaud commented that the next sentence in that paragraph which reads "He noted that five of the six areas in the EPA's AO were similar to the types indentified..." should be changed to read: "He noted that five of the six areas in the EPA's AO were **the same sites identified...**"

Mr. Pinaud reported that on page 9, the first sentence in the third paragraph which reads "MAJ Knott..." be corrected to read "LTC Knott..."

LTC Knott requested that on page 9, the eleventh line in the second paragraph which reads, "LTC Knott said that NGB agrees to everything in the order" be amended to read: "LTC Knott said that NGB agrees to everything in the order **requiring cleanup of contamination, but disagrees with the process outlined in the order.**"

LTC Knott reported that on page 9, the fifth line in the third paragraph be corrected to read: "...**the EPA had agreed to change things and that the order should then reflect...**"

LTC Knott stated that on page 10, the second to last sentence of the second paragraph should be changed to read: "He said he feels very confident that EPA **will amend** the order."

LTC Knott noted that on page 10, the first sentence of the fourth paragraph should be corrected to read: "LTC Knott reported that the Groundwater Study would continue and that a key part of that would be the UXO survey." He added that the next sentence should be amended to read: "He said that the archeological dig in **the Impact Area...**"

LTC Knott stated that on page 11, in the first sentence of the first paragraph, the word "biospurging" be corrected to "bioslurry".

Mr. Walsh-Rogalski noted that on page 12, the second to last sentence of the first paragraph, which reads "... he is heartened to hear the comments of the regulators that they choose to use SWDA" be corrected to read: "...he is heartened to hear **LTC Knott state that if he were a regulator he would use the SWDA.**"

The minutes were accepted with the changes.

#### **Agenda Item #2: Investigations Update**

(See Attachment #1)

Mr. Grant commented that, as usual, we are covering mostly the things that have occurred in the last month since the previous meeting. He directed the team members to refer to the handout they had received at the table. In terms of the monitoring wells completed in the last month, there is one area Ogden has been concentrating on and another area they are about to start work on. The first is the Impact Area; there are a number of wells in there that are called out in the Impact Area Response Plan. Mr. Grant referred the team to Figure 6 in the handout. He noted that each of the red dots on Figure 6 is a proposed well, and the ones that have been installed in the last month or so are P-9, now called MW-85; P-12, called MW-86; and P-16, now called MW-87. Mr. Grant explained that the other red wells on the map were in the process of being installed and were well nests, with several wells at different depths at each location. He said the installation work would continue over the next couple of months and should be completed by June 2000.

Mr. Grant reported that Ogden was about to install some wells in the Mortar Target Area and referred the team to Figure 1 in the handout. He noted that the two red/black dots on this map correspond to proposed monitoring well locations for the mortar targets and that Ogden was about to install those.

Mr. Prince asked Mr. Grant to identify the three Impact Area wells again. Mr. Grant noted that P-9 was the southernmost one along the eastern fence of wells, and its new number was MW-85. P-12 is one of the northern ones along the western transect, its new number is MW-86. P-16 is one of the southern ones along the western transect, and its new number is MW-87.

Mr. Hugus asked if these were the only mortar targets in the Impact Area. Mr. Grant replied that those were the mortar targets Ogden concentrated on for the purpose of the field sampling plan. He said there is

other metallic debris in the vicinity of those targets, but those targets were the ones that seemed to be most prominent; they were included in the list of targets Ogden obtained from Range Control, and they are thought to be the highest likelihood targets in that area. Mr. Grant stated that Ogden had noted there were some potential targets and metallic debris along the southern boundary of Turpentine Road that does not seem to have impacts from high explosives, which are perhaps out of the range of mortar, so Ogden does not think those were really used. He said that there are also targets farther to the east and to the north along Tank Alley and Turpentine Road, but those are probably out of the range of the mortar positions on the south side. He stated that Ogden feels these are the primary ones, but there could be a few other ones.

Mr. Hugus asked about soil sampling results, and Mr. Grant answered that he would be going over the sampling results later in the presentation. Mr. Schlesinger asked if Ogden had relied on aerial photography to ascertain whether those targets had been the only ones. Mr. Grant replied that Ogden's experience with the aerial photographs is that they cannot pick out the individual targets, as they appear too small, but that you can see extensive cratering and how it affects the vegetation in an area. He stated that, for the most part, the mortar target areas do not have real obvious effects on the vegetation over the years; the effects are less obvious than the artillery targets, for example, along Turpentine Road and Tank Alley. He said that as it was hard to tell from the aerial photographs what the heaviest use was, Ogden was pretty much relying on historic records of what targets were supposed to be used and what is in existence in the field today.

Mr. Grant then moved on to the status of groundwater sampling. He reported that the wells Ogden has been sampling the longest were the Phase 1 Wells, which had been started in 1997. He added that the Phase 2A Wells and Far Field Group 1 Wells had been installed at the beginning of 1999. He explained that the supplemental IRP Wells, which had been installed by AFCEE for the purposes of their investigation, were sampled by Ogden starting in 1999. He reported that three rounds of data had been collected for those four groups of wells, as they had been in the sampling program the longest. Mr. Grant commented that the newer sets of wells included the Far Field Group 2, which are wells Ogden started installing in late summer 1999; the gun and mortar position wells; and the Demo 1 Response Wells, located directly downgradient from Demolition Area 1 (Demo Area 1). He reported that, for this set of wells, Ogden had completed between one and two sets of sampling data.

Mr. Grant said that he wanted to mention that Ogden has collected three rounds of data for a lot of these wells and that they were trying to assess where to go forward in terms of additional sampling programs for these wells, because the initial thought was that three rounds would be collected and then the data evaluated before proceeding further. Ogden has recently issued a report to the US EPA, The Interim, Long-Term Groundwater Monitoring Plan, and the team would receive a copy in the next day or two if they had not already. The plan basically lays out the three rounds of 1999 sampling data for the wells and presents Ogden's proposal for sampling for calendar year 2000. In very general terms, the proposal is to sample another three rounds for wells that are either at, or in the vicinity of, explosives detections, and to sample another round per year for wells that are not in close proximity to explosives detections. That report is recently out to the agencies and the IART to look at, and Ogden is hoping to get comments back in the next month or so. He said that Ogden's proposal is that they would start the three rounds of sampling again in April 2000. Mr. Grant said that, in terms of wells that have not yet been sampled three times, Ogden's proposal is to get the three rounds completed and evaluate the sampling results before proposing additional rounds.

Mr. Grant said he would next like to review the newest information on explosives detections in groundwater, and asked the team to refer to Figure 2 in the handout. He reported that this figure showed the particle tracks in Demo Area 1, and recently installed response wells were shown in blue. He added that these wells were numbered from MW-74 to MW-78. He noted that at the last IART meeting he had reported that there had been profile detections in MW-75, MW-76 and MW-77. He said that this monitoring well data for this month confirms what had been seen in the profiles; that is, we are getting RDX in MW-75, MW-76 and MW-77 along the center of the apparent plume from Demo Area 1. He noted that the concentrations were pretty similar to what had been found in the previous profile samples.



He said that basically everything was confirmed what was already suspected about Demo Area 1 in terms of the size of the plume, concentrations, and the geometry moving down deeper into the aquifer as it moves farther away from the source area.

Mr. Hugus commented that, at the last meeting, some team members were concerned about MW-78. Mr. Grant explained that the issue was that the profile sample at the water table had a detection of TNT and TNT breakdown products in profile samples at low levels. Mr. Grant said that these detections had been confirmed by PDA, which means we do not think they were false positives. Mr. Grant said that this did not appear at all to be related to Demo Area 1, which is an RDX/HMX plume moving substantially deeper in the aquifer, moving approximately 50 feet below the surface of the water table. He stated that MW-78 seemed to be a separate problem, probably related to an area much closer to the well than Demo Area 1, which is about 1,000 feet upgradient. Mr. Hugus commented that, during the action items, we discussed the follow-up on MW-78 and Mr. Gregson said that he did not think it was necessary to put in any upgradient wells or southerly wells.

Mr. Gregson commented that, at this point he wanted to mention that the samples were non-detect, and the groundwater data will be further reviewed in the technical meetings to see if additional southerly wells are warranted.

Mr. Hugus asked if they were sure that MW-74 was as far north as they should go and asked if there shouldn't be a monitoring well there if it is clean north of the plume. Mr. Grant answered that MW-74 appears to be that clean well right now, and that it is clean on profiling. He said he was not sure if the sampling results were in for MW-74 yet, but that it had been clean on the profile sampling. He said MW-74 had been the last well installed, so was the last one they were waiting for results on.

Mr. Schlesinger asked if Mr. Grant were saying that the MW-78 plume is different and was coming from some different place. Mr. Grant replied that it would appear that the source of whatever was detected in the profile samples would not be from Demo Area 1, but would be something much closer to the well than Demo Area 1. He said Ogden was not sure what that was, but was something that prompted them to look at the upgradient area and try to determine if there was some possible source there. He said that, in fact, Ogden had looked closer to Demo Area 1, just a little bit south of there, to see if there was possible use of that area. Although there is probably some more work to be done there, it does not appear that there is a real obvious historic use that would create that kind of contamination. However, Mr. Gregson mentioned some data that just today came to light, and which has not yet been discussed with the agencies--MW-78 samples were non-detect for explosives from the same location where the profile samples came from. Usually we think of the monitoring well samples as being a more reliable indicator of aquifer quality than the profile samples. In this case, if there is TNT or TNT breakdown products there, they may be at very low levels, not detectable by the monitoring well screens, or they could have been some sort of artifact of the drilling process, because again, these are samples we collect during the drilling, they are not relatively clean samples. The confusion there, I guess, is that these detections were verified by PDA, which usually means we are pretty confident that the stuff is there.

Mr. Cambareri asked Mr. Grant what his thoughts were on the scarred area shown on Figure 2 and the issue about what shows up on profile versus what shows up on monitoring wells, and if the Technical Memo 99 was available. Mr. Grant replied that Memo 99-6 went out the beginning of last week, which is Ogden's draft report describing the results and the relationship between profiling and monitoring well results. He added that for RDX, it was extremely good - generally, anytime we have an RDX detection in the profile sample we get a really good correlation with that substance detection in the monitoring well. It is not as good for some of these other explosives analytes.

Mr. Cambareri noted that there had been occasions where there were detections in the profile samples and not in the monitoring wells samples. Mr. Grant said that was true.

Mr. Price asked, for example, as in MW-78 where the profile detection had been so close to the surface and now nothing is detected, what are the odds that something has moved downgradient and Ogden had just caught the tail of it. Mr. Grant said that was always a possibility when a contaminant detection disappears. Usually, if sampling events are only a month apart as these were, then you would expect it to still be there. He added that he thinks they also have to look at what the level was in the profile sample, which he thought had been pretty low. He explained that the monitoring well screen was basically sampling from a thickness of 5 to 10 feet of the water table screen, depending on how much is saturated, versus a profiling sample being from a very discrete point of 1 to 2 feet in thickness. Sometimes something is picked up in a profile sample because it just happened to be at exactly the right spot where the contaminant was, and then when you put a screen up at the same location it kind of washes it out because you are getting clean water from above and below. Basically it is a problem caused by very low levels of a contaminant. Mr. Prince commented that if they had just caught the tail of the contaminant there could be higher levels out in front of MW-78. Mr. Grant said that this was possible.

Ms. Culligan asked how Ogden was actually getting the concentrations on both the solid phase and the pulled fluids, or were they extracting solids. Mr. Grant replied that it was extraction which would involve just the liquid phase of the samples, although Ms. Culligan was correct in noting that there is a significant solid phase; in some cases, about 50% of the sampling, we are actually getting more of a slurry out of the sample. Ms. Culligan commented that Mr. Grant could be noting concentrations that have built up in the particles at that point.

Mr. Grant said he did not think that; in the way it is measured they could be measuring something - it is not extraction with a solvent, it is filtered, so they should be getting just the liquid phase of that part of the sample to the instrument. Ms. Culligan asked if in the case of MW-74 Mr. Grant had said there was no detection in the profile or groundwater samples. Mr. Grant replied that he was not sure the groundwater sampling was in yet, but the profile was clean. Ms. Culligan then asked if Mr. Grant had stated that, in MW-78, something had been found in the profile sample but not the groundwater sampling. Mr. Grant responded that MW-78 had a profile sampling detection of TNT and TNT breakdown products but the groundwater sample from the well was clean.

Mr. Cambareri noted that he had given the technical memo to Jim Stahl.

Mr. Zanis stated that before Demo Area 1 became Demo Area 1, there had been an old range out there. He noted that it had been located a short distance northeast of MW-79, and that Mr. Grant could find a range marker out there. He added that, on Figure 2, underneath the arrow indicating the direction of groundwater flow, just south of that arrow was a bunker complex with a bunch of metal stuff. Mr. Grant asked if Mr. Zanis meant the northern "direction of groundwater flow" arrow, and Mr. Zanis concurred. Mr. Grant said he thought he knew the area Mr. Zanis was speaking of, and that Phase 2B called the area E-3 or E Range, which had a triangular shape pointing to the northeast. Mr. Zanis commented that perhaps the detections came from the past use of that range. Mr. Grant said that could be, but he would have to look at the extent of that range, but, off-hand, MW-78 looks farther south than the rockets should have gone. Mr. Zanis said that he thought there might be contamination from the rockets in the groundwater flowing to the west, and Mr. Grant agreed. Mr. Grant thought that contamination passed through Demo Area 1, kind of overlapped it almost, and would be a bit deeper than the Demo Area 1 plume. He added that that would need to be looked at more closely as part of Phase 2B. He added that he thinks some investigations are planned for that range, northeast of Demo Area 1. Mr. Zanis noted that the old photographs show the correlations with MW-19 and asked Mr. Grant to look at the old photographs. Mr. Grant said okay, and that would probably correlate with some UXO detections being found in Demo Area 1 and some rockets being found in Demo Area 1.

Dr. Feigenbaum asked what explosives were used in the rockets. Mr. Grant said that certainly the rocket explosives being seen on the KD Range are RDX, HMX and TNT. He said he was not sure if it would be any different here, because it is an old range.

Mr. Borci noted that in the 1940s you would not see RDX and HMX. He said that, at the KD Range, HMX and RDX were used as fillers. He added that the problem was that the archive search and the 1943 photographs show nothing in that area. UNINTELLIGIBLE

Mr. Schlesinger asked if anyone had performed a survey on foot in the MW-78 area. Mr. Grant said he did not believe that had been done yet.

Mr. Grant then noted that the second bullet in terms of new explosives detections in groundwater refers to the Impact Area wells in the handout's Figure 6. He noted that the map shows the new wells installed, and explained that P-9 is MW-85, P-12 is MW-86, and P-16 is MW-87. He said that the first well Ogden installed, P-9/MW-85, had RDX detections at about 20 feet below the water table, with concentrations around 20 ppb, which is higher than levels seen at nearby MW-1S or MW-1 and MW-2. He said that the source area, based on that depth in the aquifer, projects backwards a little ways, and is probably south of the MW-40 area. He noted that this was all profile data, that Ogden had recently installed wells in that area, but had not yet sampled those wells. Mr. Grant went on to say that the P-12/MW-86 well at the northwest area had RDX detections at a fairly low level, just above the HA of 2 ppb, and is at a depth of 20 feet below the water table and appears to project backwards to some location southeast, certainly not as far as Pocasset-Sandwich Road but somewhere in between that and the P-12 location. Mr. Grant said the last detection Ogden found was the most notable, again at P-16/MW-87, which was RDX and HMX. He stated that the RDX detection had been approximately 34 ppb, projecting backwards based on a depth of 50 to 60 feet in the aquifer to a location just north of MW-1 and MW-40. It is looking like the detections at MW-1 and MW-40 are related, and he thinks that the southernmost groundwater flow path, shown in blue on Figure 6 in the handout, has detections that are probably related to what we have seen in P-16, with the P-16 detection being much higher. When we go to the inner transect and look at the borings for P-7 and P-8, that will help us get a sense of how wide the levels of contamination are in the center of the Impact Area.

Mr. Hugus asked Mr. Grant to address the HMX detections. Mr. Grant replied that HMX was present in P-16/MW-87 and the levels are around 2 ppb. He added that this detection did not seem to be a concern because the HA, at around 400 ppb, is much higher than that for RDX.

Mr. Grant commented that the purpose of all of these wells was to establish the nature and extent of contamination in the Impact Area where we have essentially standard detections, and we are trying to find out if these detections are related or, if they are not related, then what the geometry is of the various existing plumes that might come from that area.

Mr. Prince asked if MW-25 and the MW-58 wells south of the blue line were screened at a level to pick up what is being found at MW-87. If something is coming from around MW-40, would they be at the southern end of that? Mr. Grant replied that those wells, since they were installed for the purpose of sampling and monitoring CS-19, tend to be a little too high to measure effects from the center of the Impact Area.

Dr. Feigenbaum asked Mr. Grant what P wells had been drilled. Mr. Grant stated that most of the P wells had not been drilled yet, the only ones so far were P-9, P-12 and P-16. Dr. Feigenbaum then asked what the detections had been at MW-39. Mr. Grant replied that MW-39 had a relatively low-level HMX detection somewhat below the water table. Dr. Feigenbaum asked if any RDX had been found at MW-39. Mr. Grant replied no. Dr. Feigenbaum asked what had been detected at MW-38. Mr. Grant replied that MW-38 had an RDX detection of 2 to 3 ppb above the HA.

Mr. Borci commented that the EPA was just now focusing on this area and just starting to build a database .....UNINTELLIGIBLE He added that P-17 is part of the CS-19 IRP investigation; they installed a well at approximately that same location which had been profiled, with profile detections of RDX at 3.6 ppb and detections of HMX at .8 ppb.....UNINTELLIGIBLE P-17 is the approximate location.

Dr. Feigenbaum asked what levels had been detected at MW-1. Mr. Grant replied that the levels there ranged from 2 to 4 ppb. He said it was kind of hard to connect the dots as the wells had all been screened at different depths. He said that if you refer back to the response plan document that these came out of, which just got finalized and was sent to the IART at the beginning of January 2000, that has a cross-section view that would really help you piece it together. The figure shows how stuff comes down from one area, and then moves down through and comes back up through MW-38 and MW-39 and starts heading back up as it gets closer to the canal where it discharges, so that helps you figure out how things are connected in the vertical.

Mr. Cambareri asked Mr. Grant to comment on the MW-27 hit. Mr. Grant said MW-27 had a hit very close to the detection limit in one of the three rounds. He said that he thought the detection pattern was non-detect/detect/non-detect. It is one of these things that is kind of blinking on and off. It is also a water table well, so it is probably more related to something around that backstop.

Mr. Zanis commented that, three dimensionally, it looked like there were a lot of little fingers to the plume. Mr. Grant replied that it was really hard to say what we have, based on a couple of points. Again, Ogden will have all of these wells installed in the next couple of months and then we'll get a real good picture and will probably be able to see in the vertical how things are connected. At this point it is suggesting that certainly there is more contamination than we had expected so far. Things that have been detected, although sporadic, are connected to something else.

Mr. Prince asked if they would be searching the southern boundary. Mr. Grant said that we know correctly that there is no southern extent yet, because P-9 has got contamination, but it will be checked.

Mr. Schlesinger asked if the investigation would be going south of P-9. Mr. Grant replied that Ogden had not included that in this Response Plan, but, again, as Ogden performs the investigation, it is obvious that we will find things that will cause us to extend or write additional Response Plans.

Mr. Cambareri noted that Mr. Grant had stated that MW-37 and MW-25 had had detections as well as the 58 series wells. Mr. Grant stated that the 58 series wells were installed for the purpose of the CS-19 investigation and that he thinks a lot of those hits were related to CS-19, especially like MW-2 which is a shallow well and has relatively high levels of RDX, so it seems to be related to what is going on at CS-19.

Mr. Borci thought that MW-25 and 58MW6E, which he thought were both water table wells, had low-level detections of RDX, and at 58MW2, at the center of that five-well cluster, there had been an RDX detection of 20 ppb at the water table and concentrations carried out to MW0009E, where there had also been an RDX detection of approximately 20 ppb, which looks like a continuation of CS-19. Then at the P-17 location it appears there are three detections in a row coming from CS-19, then when you go up we have some low-level stuff. I think the thing to point out about P-9, which is the southernmost extent, is that this is really designed to trap, we wanted to start our fence going up Turpentine Road. Right now we are just starting to get into groundwater that is downgradient of that area. ....UNINTELLIGIBLE

Mr. Grant continued his presentation and reported that the latest newest groundwater detection was associated with the FS-12 plume, and noted that this was illustrated in the map labelled "FS-12 Well Inset" in the handout. What we are taking about here is 90LWA0007. It is the water table well installed directly downgradient of the L Range, which is the range that had been used for HE grenade practice, and it is also upgradient of 90WT0013, which is another well at which we previously had RDX detections. The RDX detection at 90LWA0007 is a much lower concentration than what we have seen previously, being approximately 1.6 ppb. Mr. Grant stated that the RDX level at 90WT0013 was approximately 5 ppb. He commented that both of these wells seem to have sporadic detections. He stated that 90LWA0007 had been sampled three times this year, the first two times were non-detect while the third time came up with a detection. He added that 90WT0013 had been sampled three times starting in 1998, and that the first time came up detect and the last two times in 1999 came up non-detect. He stated that it could be some sort of pulsed source coming out of the L Range as it looks like both of these wells are pointing back up to the L

Range in terms of groundwater flow. He said that the L Range was an area that Ogden has proposed for groundwater and soil investigation in the Phase 2B Work Plan, and they have yet to work out the comments from the EPA on how to go about that investigation.

Ms. Culligan asked if there was any correlation between detections and rainfall. Mr. Grant replied that it was possible, but he was not sure the correlations could be made because they did not have the rounds spaced evenly, or times when a rainfall event occurred with sampling being conducted shortly thereafter. He explained that Ogden's rounds tend to be unevenly spaced because of the way the investigation started. He said that, for example, 90WT0013 was sampled three times over the period of time between March 1998 and January 2000, and 90LWA0007 was sampled three times over the course of 1999. Ultimately we may see a correlation, but so far we don't have enough data to draw a conclusion.

Ms. Culligan asked if Ogden were planning to change the rounds for sampling. Mr. Grant said that Ogden could take a look at that, but what had been proposed for wells that are showing RDX, or if explosives detections are nearby, is sampling three times per year in April, August and December. If we go with that system, we may get some data for the April or August events being shortly after a pulse of higher infiltrations. Again, that program is up for comment at this point, having been forwarded only recently to the agencies for review.

Mr. Zanis asked what detections had been found off of the base. Mr. Grant replied that, the way the map is drawn, it looks like 90MW0022 is offpost; I don't think it really is, I think it might be inside the fenceline there. That is one that has had an RDX detection. There are some AFCEE-installed drivepoints in the investigation at the southern perimeter of the J-3 wetlands. Those drivepoints have also had detections at a depth far below the wetland, which suggests they are connected to what we saw in 90MW0022. I do not think we have actually had an RDX detection off-post in a well, I think the drivepoints are probably the closest point to that. Mr. Grant said that Ogden does have a Response Plan out for the J Range to the agencies for review that does propose additional sampling in that downgradient area, to help resolve the question of whether the RDX in 90MW0022 is possibly heading into the FS-12 extraction system. That response plan would entail additional sampling and hopefully resolve that question.

Mr. Zanis commented that we do have detections of explosives off of the base. Mr. Grant stated that we do in the drivepoint samples, but there are no established wells in those areas that we can go and sample tomorrow and say here is what's there. Mr. Zanis asked if there would be follow-up on this and if there is a likelihood that the pulsing detected in samples could be related to rain events.

Mr. Grant said he was not disputing that they were there, he was saying that we do not have an established well that we can go and sample tomorrow and say here is what is there. We believe that the RDX has moved from some point near the J-3 Range down through 90MW0022, down through DP-8 and DP-9 underneath the wetlands and is now going, or will eventually go, through the FS-12 extraction system.

Mr. Schlesinger asked if there were any likelihood that pulsed hits were related to rain events; is it correct that you cannot discount the possibility? Mr. Grant said no, he would not discount it at all. Mr. Schlesinger said therefore, every place where we have a pulsing hit we ought to correlate with rainfall measurement, correct? Mr. Grant said he was not sure it was necessarily related to rainfall so much as soil conditions - we could take a look at that. He said he was thinking that rainfall distribution throughout a year does not vary a whole lot; but varies on average about an inch or two. Mr. Schlesinger asked if it could be looked at through a time domain, as we know how long it takes to get from the soil to the water table, and therefore we ought to be able to model. Mr. Grant said we do not actually know that at this point, but we do have a proposal in front of the agencies that we have been working on to help us model from the soil into the water table. That is a model we have not run yet, all the modeling we do is in the saturated zone. Basically, from a well where we have a detection we try to figure out where it is going and where it is coming from. We have not yet figured out how long it took to get from ground surface down to that point. In respect to pulsing, the soil conditions may play a role, because there are time periods where the soils become very saturated regardless of the amount of rainfall, particularly at this time of year,

when the ground is going from a frozen condition and is starting to melt, you get this pooling of water, which we see because we have logistical problems moving around the Impact Area. There are times of the year when you are more likely to have more saturated soils, regardless of rainfall amounts.

Mr. Borci said that the only comment he wanted to make was that in answer to Mr. Zanis' question, we just don't have the data sets to do that type of modeling right now. When we set up the monitoring plan, then we can hope to get that type of data.

Mr. Grant then referred the team members to the new explosive detections and stated that they were basically in two general locations in Demo Area 1. He asked them to turn to the last map in the handout and noted that this was the only one that did not have the results for the deep soil borings. It just shows the shallow surface soil samples. The information Ogden collected in the last month is shown on the red grids on Figure 3. He said they have now sampled all surface-soil grids and have soil samples from 0-3 inches, 3-6 inches and 6-12 inches. Mr. Grant said that they also have soil samples from the yellow triangle locations which are where C-4 residuals were identified based on the site walk conducted in June 1999. The results of those samples suggest we have relatively high concentrations of RDX directly underneath the C-4 residual locations. The concentrations were much higher than anywhere else measured in Demo Area 1 previously. In fact these levels suggest that what we are seeing is probably solid particles that got incorporated into the last samples from the C-4 residual breaking down at the soil surface. Some fairly high sample results were also seen in some of the red grids shown on the map. We have not mapped out a lot yet but, again, it is suggesting that there may be a fairly good distribution, at least on the surface, of some of the RDX and that may be what is creating this source area.

Mr. Grant said that the munitions survey is currently underway for Demo Area 1. As they have been doing the munitions survey they have been looking for things such as spent munitions. When that survey is complete there will be another inspection of the area to look for C-4 residuals. Any residuals will be removed at that time and samples will be collected from those locations. Mr. Grant went on to say that it appears that, at least in the short term, we have to be concerned with any C-4 residual that remains on the soil surface to see if there are any fairly high concentrations of RDX in the soil.

Mr. Grant reported that the second general area where Ogden has been measuring RDX in the soil is the mortar target samples. He referred the team members to Figure 1 in the handout. He noted that each one of the mortar targets shown in the figure had soil samples collected and circular grids around the target. The grids had several sampling distances going regularly away from the targets. What was observed with those samples was higher RDX concentrations at the close-in circle, then either low or non-detect concentrations in the circles farther out. The circles were generally 15 feet and 25 feet from the center of the target.

Mr. Zanis asked how far out the detections have gone in Demo Area 1, referring to the difference of opinion about the area of influence. He asked if the detections had travelled outside the kettle hole. Mr. Grant replied that he thinks they have looked at the data and the signification locations. We decided it was mostly inside the bowl or at the top rim of the bowl and not much farther out from that.

Mr. Borci commented that, if you look at the MW-19 tanks in the center of Demo Area 1 and go east, he thought there are two grids. He thought those two grids had high concentrations. From MW-19 go up to the first grid up to the northwest; .....UNINTELLIGIBLE ....it sits on the lip of the kettle hole, not in the bowl that's up on the edge. ....UNINTELLIGIBLE

Mr. Grant said that he thinks the farther-out grids are where the non-detects are around the detection limits of 100 ppb. Mr. Schlesinger asked Mr. Grant if, when he said "residual", he just meant physically on the surface. Mr. Grant replied yes. Mr. Schlesinger asked if Ogden will be doing any work to determine the extent of stuff that is not on the surface, but that is just beneath the surface. Mr. Grant said that would be rolled into the munitions survey; they are doing a geophysics survey of that area inside of Perimeter Road to look at the UXO throughout that area.

Ms. Culligan asked for a description of the survey. Mr. Grant replied that that was more a question for the survey contractor. MAJ Knott asked the contractor to explain the survey.

Mr. Leo Montroy of TetraTech explained that they were using two different types of testers, a CD vapor magnetometer and EM61. Ms. Culligan asked what the depth of penetration was. Mr. Montrose replied that the EM61 was about a meter and a half, and the CD vapor magnetometer penetration depth depended on the terrain. Ms. Culligan asked Mr. Montrose if he knew what the resolution was, and Mr. Montrose replied 1 to 2 meters, 2-meter transects. Ms. Culligan asked if he meant 2 meters by 2 meters by 1.5 meters, and Mr. Montrose concurred.

Mr. Hugus said he had a question about the other targets of the soil sampling. For Targets 7 and 8, which are northeast of the Succonsette Pond, what were the levels of the explosives found there? Mr. Grant replied that actually he thinks Target 9 has the highest concentration of explosives, as it looks to be the closer one to Succonsette. Mr. Grant stated that Target 9 had concentrations of around 39,000 ppb of RDX. For comparison purposes, we have seen levels like that at Demo Area 1 but not too frequently. Mr. Hugus asked if the other target areas were lower. Mr. Grant replied that the other target areas were much lower; they were generally around detection limits, so would be in the 100 to 300 ppb range. Mr. Hugus asked if there is any explanation for why these RDX concentrations were detected in the target area. Mr. Grant said Ogden has not figured out how that relationship works. It is obvious that the concentrations are highest right at that target and diminish greatly as you move farther away, so apparently it is related to either UXO or dud rounds hitting the target, and possibly not functioning but leaving residual there. Mr. Hugus commented that he thinks this is an important finding, because, going back about a year and a half ago, there was a long debate about whether the routine firing causes contamination, and the NGB's position was that since explosives were not being found in the soil in target areas, the source of the contamination must be from some kind of areas where improper disposal took place. Mr. Hugus said he thought this sort of argues against Mr. Grant's point. He said it looks as if mortar rounds fired from outside the impact areas onto Target 9 causes contamination. Mr. Grant replied it certainly caused what we consider to be relatively high surface-soil contamination, but we cannot say what the relationship is yet to groundwater. It seems there has been some instances, such as at the KD Range, where even though there is relatively high concentrations at the surface, there does not appear to be a connection to the groundwater, for whatever reason, whether we are not getting the saturation of the soil, or what is occurring there. Mr. Grant said he was not saying that we have done all the investigation we need to do at KD Range yet. Mr. Hugus said that we do not necessarily need to find the effects of this in groundwater right beneath the target areas. First of all, it would be downgradient of the target areas, and, secondly, the fact that it is in the soil is enough to tell us that any exploded mortar round left explosives there. Mr. Grant added it could also be a non-functioning round. At this point he was just wondering if this was going to wind up in groundwater, which we don't know yet, and that is one of the reasons we are putting a well right at this location. Mr. Hugus said that he thinks that, from his point of view, this puts to rest the argument that routine training is not responsible for contamination in the soil and groundwater.

Mr. Borci commented that he just wanted to say that from our point of view when we look at the big picture, it's - I don't know how many mortar targets we have total - but I think we had residue detected at 7 of 11 targets. These were the highest detections--at the wells placed at the buoys. The other thing was that at Target 9 it wasn't just RDX, HMX and TNT at the same levels. Mr. Hugus asked what the levels had been. Mr. Borci replied that the HMX had detections of 3,600 ppb at Target 9. Mr. Grant reported that TNT had been detected at the same level; and there were some TNT breakdown products detected at lower levels.

Mr. Schlesinger asked about the detection at PMT2 and if one could assume that there is no connection to groundwater - did Ogden consider that one site adequate? Mr. Grant replied that we could say that this is one piece of the puzzle, the other piece of the puzzle would be additional soil sampling at greater depth intervals, to see if there appears to be a progression at the water table, and modeling in the unsaturated zone to try to determine at what levels we might hit the groundwater. It is certainly not definitive through the

line of one wells....UNINTELLIGIBLE Mr. Borci said he wanted to reiterate what Mr. Grant had said.. He thought that in an earlier example we used the KD Range and EPA's comments on the KD Range in the Tech Memo, one well is not enough, UNINTELLIGIBLE. And also the same thing for PMT2 .....UNINTELLIGIBLE.....so they are all pieces of this big puzzle. ....UNINTELLIGIBLE

Mr. Walsh-Rogalski stated that the data made him think of the Fort Ord study, which concluded that the levels were dropping fairly rapidly in terms of time, between 1994 and 1997. As they decreased I think they predicted that they would be gone in another three years or so. I think when we talked about this a year and a half ago, Mr. Zanis mentioned that Target 9 was the most recently used mortar target and I'm wondering if you have any information that relates to when the targets were last used. Mr. Grant said we have not checked that out, but that he would imagine that information is available. LTC Fitzpatrick said that he will check back records on when the targets were used.

Dr. Feigenbaum asked how large an area Ogden had sampled at Target 9, and if Ogden had a good sense of the extent of the contamination. Mr. Grant replied that the ring size may vary a little bit depending on the size of the target; he thought at the tank targets, there may have only been one. At the buoys the rings were 15 feet and 25 feet from the center of the target, so there is essentially a ring around the target and a series of discrete sample points within that ring and the same for the farther-out ring. Dr. Feigenbaum asked, when Mr. Grant says 39,000 ppb in the soil, what does that mean--the inner ring, the outer ring or the average of both? Mr. Grant said that is the inner ring in this particular case. Dr. Feigenbaum asked what the levels had been in the outer ring. Mr. Grant replied that RDX had not been detected in any part of the outer ring, but was detected in several locations in the inner ring. Dr. Feigenbaum asked if the 39,000 ppb had been the highest detection level. Mr. Grant said right. Dr. Feigenbaum asked what the variations in the detection levels had been. Mr. Grant said that drivepoints were labelled 1 through 8 and that the discrete samples are 1, 3, 5, 7 as you go clockwise around the grid. He added that the two detections in the inner grid ring were at Position 5, where there was a level of about 700 ppb of RDX, and Position 7 had the 39,000 ppb of RDX detection. He noted that those two positions were on the same side of the target. Dr. Feigenbaum asked Mr. Grant if Ogden felt it had characterized the area of contaminated soil and groundwater. Mr. Grant replied that it was difficult to say because the stuff can be fairly heterogeneous in its distribution, so sometimes you will have them together in a sample that will drive it up to a fairly high concentration. The fact that we do not see any in the outer ring probably means that we have levels decreasing rapidly as we go away, but he didn't think he could say that there isn't anything farther out. Dr. Feigenbaum asked if there was a removal action planned for this. Mr. Grant said that this has not yet been discussed in the technical meetings, but that typically when they get higher levels they do something on an interim basis to try and remove the material immediately, so he thought it would not be out of the question. Dr. Feigenbaum commented that he would like to make sure that the technical people, when they get together, are happy that the area has been well characterized and that he felt they should plan a soil removal.

Dr. Feigenbaum asked when PMT2 would be on-line. Mr. Grant said that the current plan was to get out in the field at the end of March 2000. PMT2 unfortunately has a long road-building effort associated with it as it is out in the middle of nowhere, so that will probably be the second well installed, and PMT1 would probably be the first - I would say early to mid-April 2000.

Mr. Hugus asked Mr. Grant about the soil-sampling techniques. He commented that Mr. Grant had found the 39,000 ppb RDX in discrete soil samples. He said he wondered if we are finding things now because of the use of this method rather than the composite soil sample method. He asked Mr. Grant what he thought about that. Mr. Grant replied that he has not done an analysis of this data for the difference between composites and discretetes, but he thought generally what we saw when we did analysis for the KD Range, for example, was that there was not a whole lot of difference in the overall results we were getting where we were able to detect explosives using either method. Again, we have not looked at the discretetes versus the composites on this data to try to determine if that is the case. We have some unresolved comments from the EPA on discrete versus composite results for the KD Range, so he thought it was still an open question. Mr. Hugus said he would like to see a progress report of some kind, or a summary or



conclusion about this question of whether discrete samples versus composite samples are more effective. Mr. Grant said that just as we are talking about that, he noticed that the composites for the outer ring do have an RDX detection. This is one of those situations where the outer ring composites found something that the outer ring discretetes did not. He thought it was a similar situation to what we saw at the KD Range, the results were pretty similar; sometimes it would show up in the composites and sometimes in the discrete. Again, we need to take a closer look at these data to determine that.

Mr. Zanis asked Mr. Grant how far out the inner rings at Target 9 go. Mr. Grant said about 15 feet. Mr. Zanis asked about the area around Target 9 that is heavily blown up, sort of like strip mined, how large is that area? Mr. Grant replied that the heavily cratered area was about 15 feet. Mr. Zanis said that although he did not bring the photographs with him, they show that the area in question has a 50-foot diameter. Mr. Grant asked if they were photographs of these particular targets. Mr. Zanis said the photographs were of those exact targets.

Dr. Feigenbaum noted that there is a hit of EDB at 110 nanograms per liter in ECMWSNPO2 right near Snake Pond, which he figured out to be .11 micrograms per liter, which indicates that the HA level would be at 50; but it should be at 20, so it is about five times the MCL. First of all, my plea is that these are hard enough to read without mixed units in the chart, I think you would make some effort to get the MCLs correct. My question is whether this finding is known by the IRP, and is this subject to treatment by the FS-12 fence? Mr. Grant said he did not know what Dr. Feigenbaum was referring to. Dr. Feigenbaum explained that page 2 of the February 17, 2000 document containing the validated detection of VOCs, which was dated Monday, February 28, 2000 and it was the fifth or sixth entry from the bottom, 1,2-dibromoethane. MAJ Knott asked if the team could move on to the next presentation and do a mailing on Dr. Feigenbaum's question. Dr. Feigenbaum said okay, it is a hit of five times the MCL of EDB, it is right on Snake Pond and it is not an IRP well, it is an IART well.

Mr. Borci said that to jump in here real quick, he believes IRP does know about it and that it is an IRP well. He said that all these samples...UNINTELLIGIBLE We picked some of that, the FS-12 wells that the IART monitors for explosives, it is our understanding that this came up and....UNINTELLIGIBLE He said he believes it is right near the edge of Snake Pond, and not picked up by FS-12.

Mr. Dow asked if the discrete sample at Target 9 could be subjected to some kind of spatial interpolation in order to find out the area you would have to clean up...UNINTELLIGIBLE Mr. Gregson replied that more sampling data would need to be collected before any action could be determined.

**Agenda Item #3: Rapid Response Action Plan and Public Participation Plan**  
(See attachments #2 and #3)

COL Knott stated that what he would like to do for the Direct Response Action Plan was turn over the presentation to Ogden, to be followed by Jan Larkin who would talk on the Public Involvement Plan.

Mr. Veenstra introduced himself as Ogden's supervisor for the contract for the Rapid Response Action (RRA). He referred the team members to the handout. He stated that although there were no copies of the handout for the public, if anyone wanted a copy to see him afterwards and he would get a copy to them through the mail. He stated that he would provide a quick overview. He stated that he would speak briefly about the AO#3 Appendix A requirements and noted that he would touch on the six AOCs listed in Appendix A. He added that he would follow up with an identification of the contractors that would be involved in the action, touch on schedule milestones, the status of the draft RAA Work Plan and what it will take to get to a final of that Work Plan. He said he would also discuss what additional data would be collected and get into the source control methods, the innovative treatment technology proposed as far as this action is concerned, and wrap up with the site restoration. Mr. Veenstra stated that he would have Ms. Smith speak about the community involvement plan which was included with the RRA Work Plan. He added that the community involvement plan is a sub-part of the larger public participation plan that Jan Larkin will talk about.

Mr. Veenstra commented that, regarding Appendix A of the AO#3, he thinks that all of the team has heard about this from the NGB, so he would be brief. Ogden is basically to conduct a rapid response action on the six areas of concern. He stated that the primary objectives there would be to remove soils that are potential sources of contamination and to confirm conformance with performance standards; in other words, after the potential source of contamination has been removed to ensure that an agreed-upon performance standard for the project has been accomplished. Mr. Veenstra stated that the third requirement is to restore the areas that are disturbed as a result of implementing the RRA, and that the final requirement would be to treat or dispose of those contaminated materials.

Mr. Veenstra noted that there six AOCs, referred the team members to the map in the handout (Figure 1), and noted their locations on the map. He listed the six AOCs as the Steel-Lined Pit; Study Area 2; Firing and Target Areas of KD Range; J-3 Wetlands; Gun Positions (GP) 7 and 16; and one of the Armored Personnel Carriers (APC). Mr. Veenstra went on to say that the contractors put together to participate on the team to address the RRA include Ogden Environmental functioning as the supervisory contractor, a very similar role to that undertaken by Ogden in response to AO#2 and the berm maintenance program conducted a couple of years ago. He added that the EnviroTech Center was on board to provide some innovative technology evaluation, as well as community involvement support. Mr. Veenstra stated that USA Environmental, a contractor that should be familiar to the IART from working with Ogden, was hired to run the Impact Area Groundwater Study. He noted that Severson Environmental was back on board, and that Severson had been the contractor brought in for the berm maintenance program. Mr. Veenstra stated that Brice Environmental had been brought in for the soil washing component of the innovative technology to be employed, and that Envirogen would be performing the biotreatment component.

Mr. Veenstra then reviewed the scheduled milestones of AO#3. He said that there was a requirement that a Draft RRA Work Plan be submitted by March 1, 2000, which had been delivered to the agencies, the IART and the Senior Management Board (SMB). He added that the next requirement was that work commence 14 days after an approved work plan was in place, and noted that he would talk a little bit on how Ogden would get from where they are today with a draft to a final accepted document.

Mr. Veenstra reported that AO#3 contained two other deadlines, one to complete source control by October 1, 2000, followed by completion of site restoration by December 1, 2000. He added that the last requirement would be within 45 days of demobilization from the field, and a Completion of Work Summary Report would be provided, detailing what had been done accomplished in the project and providing all the lab data.

Mr. Veenstra then moved on to the Draft RRA Work Plan. He commented that it had been submitted on March 1, 2000, as required, and that it contained proposed cleanup standards, proposed source control methods, proposed innovative treatment technologies, and proposed project schedules, as well as some information pertaining to public involvement, tonight being the first of Ogden's series of presentations. He noted that there would also be a posterboard session before the SMB meeting on March 22, 2000. He stated that having a draft plan in to the agencies meant that Ogden was awaiting approval or comment. He said that in the past, EPA had collected or consolidated comments from the agencies and the public, and fed those back to the NGB, and that Ogden would like to do that again. Mr. Veenstra said that if the draft work plan is not approved as it stands, Ogden would incorporate the EPA's and public's comments received into a final document, which would be returned to the EPA for approval within 18 working days. He stated that at that time, Ogden would conduct additional public presentations at the IART meetings and posterboard sessions at the SMB. He noted that the proposed schedule in the draft work plan also indicated that there would be agency acceptance of the final work plan within 20 working days of submittal. Those dates are key for Ogden in meeting their final deadline of October 1, 2000 for source control removal requirements.

Mr. Hugus asked if the sites MA DEP had requested be addressed in their order were included. Mr. Gregson replied that the sites MA DEP had wanted addressed were the steel-lined pit, Study Area 2 for

EDB, the KD Range, the APC and the gun positions. Mr. Borci asked if the J-3 wetlands for dieldrin was on the list. UNINTELLIGIBLE

Mr. Veenstra noted that one of the things Ogden has identified is that there is a somewhat aggressive schedule involving this program, and Ogden has a deadline of October 1, 2000 to meet a source control removal requirement. One of the items that the order allows for is the collection of additional data -- something that is certainly necessary before we go out and start digging up the dirt. He stated that this was explained briefly in the work plan. In essence what they will do is perform additional soil sampling on a grid basis, the sort of stuff that Mr. Grant has been doing routinely in the Impact Area Groundwater Study, the same methodology and same analytical methods. There will be a field sampling plan to identify those grids, numbers of samples, etc, the idea being to find the excavation footprint that we are going to go out and dig up when we go in and remove this source of contaminants.

Mr. Veenstra stated that, before we go back out and start using hand augers again, we'll use UXO avoidance for safety. Source control typically refers to getting that material containing contaminants out of the ground and into a controlled environment. He added that, prior to going out and doing source control or removal of the source contaminants, we actually need three different items in place. One of those is an approved work plan, so we are all in agreement on what we are aiming for; second is the excavation limits delineated (that is what the additional sampling is designed to meet); and the third item is that, as part of the innovated treatment technology, Ogden will complete a treatability study. Mr. Veenstra noted that with those three items in hand, Ogden would have the information as to how much material we have to address, the concentrations we are required to clean up, and the process by which we will address that material which is removed from the ground.

Mr. Veenstra went on to say that once those three are in place we can go out and conduct source control, which again calls for UXO work, although this time it is going to be clearance, not just avoidance. We are going to dig out materials and clear the UXO in that footprint area, with some buffer zone around it to allow for heavy equipment. Dr. Feigenbaum asked who would perform the UXO clearance. Mr. Veenstra replied that USA Environmental would be involved in that again. He added that Ogden has excavation plans in place based on the additional delineations and is set to move forward. He stated that materials Ogden excavates from those AOCs will be transported to a central location. Having moved those materials from the excavation and putting them in a central location, Ogden will again take confirmation samples from the excavation to see if we did remove to the concentrations as agreed upon in the cleanup standards for the program. Mr. Veenstra stated that the post-excavation sample results will be compared to the agreed-upon cleanup statements to say yes, we have done enough, or, in the worst case, no, we are not quite there yet, we have to remove a little more material.

Mr. Veenstra stated that having moved the excavated material to a central location, we then step into management of that material. He explained that in many removal actions, that is putting it in a dump truck and hauling it off to a landfill somewhere. He added that the NGB has expressed an interest in doing something that is a little more innovative, to reduce or eliminate the contamination rather than just transferring it someplace else. Mr. Veenstra said that as part of this program, the Environmental Technology Center will assist with identification of technology. What is proposed is to demonstrate this technology on a large scale here at the MMR. He said that this technology has been demonstrated and implemented at other similar sites, so it is not the first time it has been attempted. He added that what is innovative at this particular site is linking the two separate technologies, the soil washing and biotreatment together in one methodology.

Mr. Veenstra said the purpose of soil washing is to remove rocks and debris which generates a slurry and concentrates the contaminants for subsequent biotreatment. He explained that the soil washing portion would be performed by Brice Environmental and that biotreatment of the slurry produced by Brice Environmental would be handled by Envirogen, which has been discussed in detail in the Work Plan. Mr. Veenstra stated that, upon completion of the biotreatment, again there will be process confirmation samples

taken to see if we did reduce the contaminants in the soils to concentrations agreed upon as a cleanup standard.

Mr. Veenstra noted that restoration of the sites affected by the removal action is a requirement, which has a deadline of December 1, 2000 for non-wetland areas. He explained that at the AOCs, with the exception of the J-3 wetlands, the proposal is to backfill the excavated areas. Backfilling could be done with imported fill or, potentially, treated material if it meets cleanup standards. He said he would leave that one open for discussion and resolution with the agencies. He went on to say that also the backfilled areas would be covered with topsoil, and a seed mixture applied. We'll try to get that established late this Fall, and then come back in and reseed in the Spring. In the interim, we will leave in place temporary erosion control methods such as hay bales, that sort of thing. Mr. Veenstra commented that with the J-3 wetland, assuming we get in there to do removal work, we are proposing a topsoil and peat mixture plugged with moss from the existing wetlands to reestablish the area.

Mr. Veenstra said that covers his portion of the presentation and stated that Ms. Kristin Smith, of the Environmental Technology Center, will explain the Center's work to be conducted on behalf of the community involvement program.

Dr. Feigenbaum asked if Severson Environmental were a subsidiary of Jacobs Engineering. Ms. Smith replied that they were part of Sverda.

Mr. Schlesinger asked if there would be another session where participants could discuss the work plan and ask detailed questions. He said he would like some discussion of Method 2 talked about in the text. Mr. Schlesinger commented that his reading of the work plan document shows that Ogden is making a real effort to actually reduce the cleanup contaminants, rather than just clean up the contaminants with respect to dieldrin, aluminum and magnesium in the steel-lined pit area. He asked for comments on this. LTC Knott replied that the questions could be answered now or during the three public comment periods in connection with the work plan. LTC Knott said this meeting was one of them, and the posterboard session before the next SMB meeting would be another, and UNINTELLIGIBLE is the other. We will give the EPA a modified version of the basic comments received from the public. Mr. Borci added that....UNINTELLIGIBLE.... the posterboard session....UNINTELLIGIBLE. That would probably be about April 6, 2000....UNINTELLIGIBLE.

Mr. Schlesinger said he does not quite understand why Ogden is eliminating dieldrin, aluminum and magnesium in the steel-lined pit area and asked for an explanation. Mr. Veenstra said he would have Mr. Clausen explain. Mr. Clausen said that the approach Ogden took was to first look at the Massachusetts Contingency Plan (MCP) numbers on various compounds listed in the AO#3. He stated that where there were established numbers, that was what Ogden used as a cleanup number. Mr. Clausen added that the next step was, if there were compounds that were inorganics and did not have an MCP number, then they looked to see if there was physical data to do the mathematical equations. Based on the MCP guidelines and through that process, they could come up with a cleanup standard. Mr. Clausen said for those compounds remaining that Ogden could not do a calculation for, or if there was not an MCP number, then they'd use the analytical detection limit of the particular compound. Mr. Clausen said that he believes the soil has been removed at the steel-lined pit. MAJ Knott commented that 55-gallon drums..... UNINTELLIGIBLE.

Mr. Schlesinger commented that what the work plan says is that you are removing magnesium and aluminum as non-hazardous substances. Mr. Clausen said we did the calculations and looked at the MCP numbers for those compounds, for aluminium and magnesium, and they were not listed as hazardous substances under the MCP guidelines.

Ms. Culligan asked for clarification on the soil washing and asked if it would screen for large soil contaminants. Mr. Veenstra said soil-washing was designed to do two things: one is to remove materials that are not desirable in the slurry in terms of the biotreatment itself, so, yes, you will be pulling out rocks,

potentially metallic debris, that sort of material in addition to the physical separation in the screening phase. The other purpose of the soil washing is to concentrate the reduced volume, or concentrate the contaminants into that slurry. Ms. Culligan then asked if with the biotreatment was aerobic degradation. Mr. Veenstra referred the question to Mr. Larsen of Envirogen. Mr. Larsen said that Envirogen was going to do a treatability study that Mr. Veenstra referred to earlier. He added that the study would identify the degradation processes that will work best at MMR. Mr. Larsen explained that there is an initial aerobic phase which will break down the first nitro group of, for example, DNT; then there is an anoxic process that breaks it down further. He commented that there was a fair amount of literature on this and Envirogen has had some experience at other bases where they have complete biodegradation of HMX, RDX and TNT.

Ms. Culligan asked about the timing of the process. Mr. Larsen replied that for this process Envirogen was estimating on the order of 60 days, and they will have a much better estimate after the treatability study is completed.

Mr. Schlesinger asked for an explanation of why dieldrin was proposed to be exempted. Mr. Veenstra replied that it was his understanding that there is an exemption for pesticides when applied to land surfaces as intended. He said it was Ogden's understanding that the MA DEP has an exemption for such materials, and we will need to provide some additional documentation of that application. Mr. Schlesinger asked if Mr. Veenstra was saying that the Guard applied dieldrin as exempted and asked if he knew who applied it. Mr. Veenstra replied that he personally did not. Mr. Schlesinger asked what the reason was for the proposed exempting of dieldrin as a contamination of concern by the pesticide application rule. Mr. Pinaud commented that the MCP allows dieldrin to be ruled out as a contaminant if it can be shown that it has been applied legally for its intended use. He explained that if they can show that they applied the pesticide legally, then it is not considered a contaminant under the MCP. Mr. Schlesinger asked what "legally" meant. Mr. Pinaud replied that if they can show that they applied the dieldrin during the time it was legal to apply in the quantity that was legal to apply at the time, then it is not considered a contaminant. Mr. Borci said that he just wanted to add that he believes that.....UNINTELLIGIBLE ..... under the IRP program that that exemption has not been ..... UNINTELLIGIBLE.

Mr. Schlesinger asked where the liquid portion of the soil washing goes. You said that if the soil meets certain standards, it will be put back or added to the excavated areas, but what happens to the liquid portions? Mr. Veenstra said he would explain a little clearer. He stated that the soil washing is a multi-stage process. Assuming you remove oversize stones, debris, things like that, that you don't want to put in the bioslurry--the end-product of the Brice soil-washing activity will be a soil and water slurry which is then pumped to Envirogen's tanks where they will conduct biotreatment. The end result of what Brice has done in soil washing is now a slurry in Envirogen's portion of the process, and the rocks, debris, and that sort of thing doesn't get shipped to the site. The liquid phase of the soil washing will be provided to Envirogen. The biotreatment is projected to be done by a 50/50 water to solid mixture. MAJ Knott added that a video was being produced on the process that might help and that it would be available soon. Mr. Veenstra noted that Ms. Smith made a point that at the posterboard sessions, fact sheets were being included on the technologies, and technical representatives from each of the companies were in attendance to answer any questions.

Mr. Dow said he had a question about the restoration of the wetlands. He noted that Ogden was proposing to put back the soil and vegetation and stated that it has been his experience that the hydrology is equally, if not more, important than just putting back the soil and vegetation. Mr. Dow asked what was going to be done to make sure that the hydrology is maintained so that there would be a functioning wetland, and not just a pile of soil and plants. Mr. Gregson replied that as far as the J-3 wetland was concerned, it was a very small area measuring approximately 10 feet x 10 feet and 6 inches deep. He stated that as far as hydrology is concerned, he did not see a great alteration in the wetlands hydrology.

Mr. Stahl asked how Ogden would monitor the pipestream (rocks, debris, etc.) in the soil-washing remediation process to make sure they were not going to pass the contaminant. He asked if there would be a monitoring system in place to ensure that what doesn't go on to the Envirogen process is clean. Mr.

Veenstra replied that the Brice soil-washing system is typically set up so that the first stage is power washing; high-pressure water is sprayed onto materials coming across a conveyor belt to remove contaminated soils and that sort of material. Mr. Stahl asked if that would remove all residues, everything over a particular size. Mr. Veenstra replied that in the past it has taken off rust, residues and accumulations of material from the rock surface itself, yes.

Mr. Stahl said his next question was for Envirogen. He commented that Mr. Larsen had mentioned that the first stage of the cleanup would be an aerobic process. Mr. Stahl said that it was his understanding from the literature that an anaerobic process treats most of the nitro-aromatic and the nitro-cyclic compounds; the first steps are primarily anoxic, it is a reductive process where the nitrates, the  $\text{NO}_3$  group, will go through a reduction process followed by an aerobic process, which seems to be much more efficient. Mr. Stahl asked if he had misunderstood that Mr. Larsen had said he was first going to do an aerobic and then an anoxic process. Mr. Larsen replied that it will start as an aerobic process, but what will happen is that the soil will be transferred into a bioreactor that will add a substrate, most likely molasses, then what will happen is that the aerobic bacteria will consume that and turn the system anoxic. Mr. Larsen said that Envirogen has been licensed to use this biotechnology process at the site. Mr. Stahl went on to ask if, after the anoxic process, Envirogen would come back with an aerobic treatment to clean up the by-products. Mr. Larsen said that would be evaluated as part of the treatability study, the microbiologist that he has been working with in the laboratory in New Jersey expects that it will likely pulse the system between aerobic and anoxic, depending on the combination of compounds in the slurry. That is part of the treatability study, to optimize that process.

Mr. Schlesinger stated he had a question on background levels. He said that the work plan said it is specifying use of background levels as cleanup standards as an option for proposing an alternative cleanup standard, and then it says the NGB is adopting background levels as the cleanup standard. Mr. Schlesinger commented that the IART has never fully figured out what the background levels in soil are and asked what background levels were being talked about. He noted that these statements were on page 26 of the Work Plan. Mr. Schlesinger said that the IART had had a study on background levels in soils, but that had never fully ironed out what those levels are, we always talked about increasing the number of samples and working on this project a little bit. He said that he was wondering what the levels would be compared with. Mr. Veenstra replied that another way to answer Mr. Schlesinger question is to use background data where that exists and referred to Table 2 on page 40 which contains the proposed soil cleanup standard, which he noted were calculated values, or analytical reporting limits, not exact background.

Ms. Smith of the EnviroTech Center introduced herself and stated that the EnviroTech Center's mission is to identify, investigate, demonstrate and, hopefully, commercialize innovative technology. She stated that the first thing she wanted to point out is that the citizens of Cape Cod are legitimate partners in this whole project and legitimate partners in the projects that go on at the MMR. She said that we are hopefully going to further that philosophy during this project with the NGB. Ms. Smith said that this was a new remediation program, and she did not think that anyone has probably heard for the first time that we are trying soil washing and bioremediation together. She explained that because of that, we will be making concerted efforts to inform the citizens of Cape Cod, the public and the community about what is involved in the whole project. Ms. Smith reported that that we are going to start that upwards by developing fact sheets. She said that there would be an extensive posterboard session on March 22, 2000 at the Falmouth Elks just prior to the SMB meeting. She stated that we are going to bring you up to speed as quickly as possible, and we especially at the EnviroTech Center are excited to have this opportunity to keep the community informed. Ms. Smith added that she compliments the NGB for jumping into this innovative technology. She went on to say that the EnviroTech Center wanted to encourage community involvement, and wanted comments from the public, which would be collected at the March 22, 2000 posterboard session. She stated that EnviroTech would compile the comments to be incorporated into the final document. Ms. Smith said that along the way the EnviroTech Center would make sure that they had a clear and concise understanding of what was going on. Ms. Smith said that she wanted to assure the IART and the community of a full and fair discussion of all the issues on the table. Ms. Larkin stated that the informational materials to be used will be similar to what the team may be familiar with, including color-

coded fact sheets. She added that Envirogen had a terrific videotape, and that she will have that on hand at the posterboard session. Ms. Smith said there will also be media releases and press conferences and that Mr. Gregson of the Impact Area Groundwater Study (IAGWS) office has volunteered some of his people to update the IAGWS website with this information. Ms. Smith said that this is a critical issue with the SMB, the IART and all the regulatory agencies and that she thinks the key to that is communication, open both ways, that is kept very constructive because we all are working toward the same goals. She said the EnviroTech Center pledges a timely response to the IART's concerns and was setting a goal for themselves of a 24-hour turnaround time for answers to questions. She added that she saw a lot of familiar faces and the EnviroTech Center would keep up with them on an ongoing basis and that she looks forward to working with those people she does not know. Ms. Smith commented that her communication strategy was straightforward, maximum information to the team with minimum delay. She said the EnviroTech Center intended to be honest, frank and open in all the information presentations and in any discussions. She stated that this was of the utmost importance to all and that she hoped that, in return, the community would be straightforward, honest, frank and open in order to keep the project on track and get it accomplished as quickly as possible.

Ms. Larkin stated that she was presenting this evening because Dan Allen from the NGB could not be here. She added that Mr. Allen was the environmental public involvement person for the NGB, and had been working on the public involvement plan for AO#3. Ms. Larkin reported that the public involvement plan had been submitted to the EPA, who then returned comments. Ms. Larkin said that the EPA comments revolved around two issues, one was the time lapse for doing community interviews, and the other issue was the decision process. She said that she would like to touch briefly on each of those issues and answer any questions. She noted that this process was ongoing and that NGB was working on getting the plan back to the EPA on the EPA's deadline.

Ms. Larkin reported that the EPA requires community interviews before putting any public involvement plan together and that the interviews were considered a critical part of any public involvement plan. She explained that doing so was a time-consuming process, and that there were time constraints in AO#3. She said that there had been a conference call with the EPA to talk about the time constraints, and it was suggested that, instead of doing the full community interviewing process, the NGB could do more of a community profiling as the basis of the public involvement plan.

Ms. Larkin commented that she thinks there has been some misunderstanding about community profiling. She explained that because there has been a lot of work done previously at MMR with the community, what NGB will do is take the information that is available and pull that together. Ms. Larkin said that she had talked with Mr. Allen, who has a contract in process to do that. She noted that AFCEE/IRP had recently completed a lengthy series of interviews and had prepared a report. She said that NGB would use the information from that report to put their plan together. She went on to say that Fall the EPA, MA DEP and JPO had done a focus group project, and the information collected there would be pulled into NGB's plan. Ms. Larkin added that team meeting minutes and newspaper articles would be collected, and some limited interviews would be performed. She said that there are lists of other information available on what community concerns are, how citizens like to receive information, and what the community would like in terms of community involvement activities. Ms. Larkin said that she hoped that by pulling together all the work that had been done in the past several years at MMR, NGB would quickly put together a good community involvement plan.

Ms. Larkin reported that the EPA had also had some questions on the decision process based on the AFCEE decision-criteria matrix process. She stated that this process had been developed by AFCEE and the regulatory community after AFCEE started working the IRP. She explained that it is based on the CERCLA criteria for the acceptance of a cleanup technology and that there are nine criteria that are looked at before deciding on a technology. One of these criteria is community input, and the regulators strive to incorporate community-based decision-making early in the process. She commented that this was what Ms. Smith had been speaking of, hoping that in this community involvement plan we can come up with a process that will include all segments of the community inputting information into the process very early

on, in order to come out with technology and cleanup direction suitable for the community and the regulatory agencies, as well as the NGB. Ms. Larkin stated that she would be happy to take any input from the team.

Mr. Hugus stated that after the EPA cleanup order came out, there was a lot of talk from the NGB and the JPO about the fact that AO#3 did not include sufficient public involvement. He said that what was left out of that complaint was the fact that it was up to the NGB to provide a public involvement plan. Mr. Hugus said that what has happened is that the NGB has said that they are not ready to put out a public involvement plan and that what they are doing is they are going to interview people in the community to find out what their concerns are. He added that this process does not seem to acknowledge that we already have community involvement at the IART table. Mr. Hugus said he does not understand why the JPO feels that they have to do these interviews and asked if EPA really required that of the NGB. Mr. Walsh-Rogalski said that was a requirement of AO#3. He explained that what he had hoped to do was that EPA had heard that people were happy with that phase of the IRP and what we had hoped to see was something that mimicked that.

Mr. Walsh-Rogalski stated that EPA's basic concerns about the plan were the timing and vagueness. He explained that EPA was afraid that the community profiling process itself would delay the development of the public involvement plan. He said that what EPA had stated in their comments was generally "we have something that is working under the IRP, let's use that to move forward." He added that if we want to fine tune that with the community, that's fine, but a lot of community input has already gone into decisions based on IRP data. Mr. Walsh-Rogalski said EPA had also responded to a request that a third party facilitator be brought into the IART meetings, which was felt would make the meetings a bit more structured and impartial.

Ms. Larkin said that, if you look at the EPA guidance for Superfund cleanup, one of the first things that is required is a series of public interviews. It is very clear in the EPA guidelines that public participation in the process must be included. The reason that we have taken the community profiling approach is only a first step. There has already been a lot of work done here with the community, and what we hope to do is to be able to develop a good plan based on the input gathered. We have to go out and poll the public, use this information to put into an appropriate community involvement plan, and do it quickly. The reason we have taken the profiling approach is that there has already been a lot of work done in the community.

Mr. Murphy commented that to clarify the community interview issue, there are varying interpretations of what should be in a public involvement plan but, according to EPA, it should contain adequate community interviews. Therefore, if we're talking about a new site, where we know nothing about it, then EPA would expect a large community interviewing process. He added that at a site where EPA has been involved for a long time, this would be similar to a community involvement update where the bulk of that is done by making phone calls to people who are actively involved to find out what their concerns are. Mr. Murphy said that EPA's response was that EPA did not see a wide-scale need for a community interviewing process. IRP has just completed a four-month process and conducted a series of 40 interviews and received questionnaires back from about 75 or so people. He said that EPA's feeling is that we have heard from a lot of people so we really don't need a whole round of community interviews, we can supplement the IRP process by talking to people about issues.

Mr. Hugus commented that one point he wanted to make about the community interviews is that a lot depends on who you interview. He stated that obviously if AFCEE, IRP and JPO are choosing the people to be interviewed, the study will be biased. Ms. Larkin said the interviews have already been conducted with the full concurrence of the regulatory agencies.

Mr. Hugus said he understood what community interviews are and asked what community profiling was. Ms. Larkin referred to the slide she had shown entitled "Community Profile" and explained that it was a broad-based term which referred to taking all the information you can get, pulling it together and trying to come up with concerns and issues people have. She said that meeting minutes and newspaper articles will



be reviewed, interviews have been done, and whatever is out there that has information on community concerns will be compiled. She added that it is not just interviews, although limited interviews will be conducted. Mr. Hugus commented that he was surprised that so much fuss was made over the lack of community involvement and questioned the NGB's decision to come up with the plan. He stated he thought it is actually a vague plan. Ms. Larkin replied that she thinks the plan will accomplish all of the things that are required.

Mr. Hugus said he would also like to comment that for three years the community has been involved in the Impact Area Study, and he did not feel that there has been no public involvement—we have been working quite a bit. The public comes to our meetings and are free to speak up. Mr. Hugus noted that he has experience on another team, related to studying health issues on the base, the ATSDR CAP, and that agency, possibly with JPO's advice, has cancelled our regular meetings and gone on to do focus groups which is exactly the same thing that we are talking about for this Impact Area public involvement. He explained that the effect of that has been to undermine the ongoing business of the ATSDR team in the name of public involvement and that he finds it an insidious way of hurting public involvement. He said that it seems like what you are trying to do is circumvent the community that is already here. Ms. Larkin replied that the ATSDR decision to go out and do focus groups was totally unilateral on the part of the ATSDR. Mr. Hugus said this seems identical to what is being proposed. Ms. Larkin replied that it was not. She stated that the meeting minutes would all be included, as it is very important to have included all of the discussions which show a lot of community involvement over the past few years.

Mr. Prince asked about the notification protocol in the work plan. He asked if the other organizations operating at the MMR to be notified, as stated in the work plan, would include the IART team. Ms. Larkin said that she thinks that the IART team would be on the notification list.

Mr. Dow commented that regarding community profiling, he had participated in one of the focus groups and considered it a total waste, and he thinks that all the other people who were environmentalists in that session felt the same way. He said that he would hope the NGB would not give too much weight to them. Mr. Dow then stated that it seems that many of the posterboard sessions are held in connection with SMB meetings; he said he attends those and is often one of only a handful of citizens there. He noted that he thinks it is a good idea to have meetings held out in the communities instead of on the base, but is not sure that joining with the SMB is the proper way to go forward. Ms. Larkin replied that if Mr. Dow had another suggestion she would like to hear it. Ms. Smith asked Mr. Dow to remember that obviously all involved citizens here are very well acquainted with the Impact Area, but, as you go into the broader community to acquaint them with the issues, community forums and presentations would be necessary. Mr. Dow suggested something like a county fair, where with a wider range of people you could get more public citizens involved. Ms. Larkin stated that a presentation at the APCC event was planned and asked for other suggestions.

Ms. Crocker said she would like to congratulate Ms. Smith for using the term "broader community". She said she attended a focus group meeting and had trained as an environmentalist in college, and had had educational and public campaign experience in the field. She stated she was not a chemist or engineer, but knew a little bit about it. She stated that as an environmentalist attending the focus group meeting, she was very pleased to have an opportunity for the "broader community" to have a point of view. She said that, as she said at a previous IART meeting, she observes that there is not a broader community representation in the attitude and focus of some of the citizen members of the team. She said she admires them for their hard work, but that she thinks that the new trend to have a broader community representation should be highly commended. She continued that, since we want to go along with EPA and do the community interview approach, and as AFCEE has proven themselves professionally and she does not really have a complaint about that, she thinks it is good that the EPA has begun to cooperate with the team members and some of the rest of people around the table so we have a broader process happening. Ms. Crocker commented that she thinks they are moving in the right direction to improve, to expand and to get out public information.

Mr. Zanis stated that he seconds Mr. Dow's comments and that he refused to participate in the ATSDR focus group. He said that he wondered how the broader community could make decisions if people are going out and giving out disinformation, when they know darn well what the truth is. Mr. Zanis said he saw a tape of a television show the other night in which LTC Knott stated that there is no contamination that has left the base boundaries, which is not true. Mr. Zanis stated that LTC Knott had said that the APC contained only benign metals, which is not true, and made no mention of what was underneath it in the ground. He asked how people could make good decisions when they do not hear the truth.

Mr. Cambareri commented that regarding the community involvement program, he is not sure the same trust exists with the JPO at this point as with the IRP. He stated that he understands that the EnviroTech Center had two roles, evaluating the innovative technology, and public involvement. He said he was concerned about EnviroTech's role in public participation. Ms. Smith replied that the EnviroTech Center was a strong advocate of innovative technology, which was their entire mission. Ms. Smith said that the EnviroTech Center thinks that this technology is a very good idea to expand and broaden its services, not only with the NGB, but to the AFCEE, the Marine Corps and the Coast Guard. She said that the EnviroTech Center was expanding its role into renewable energy projects. Ms. Smith stated this was an attempt to broaden their role and a wonderful opportunity to develop a relationship with the NGB. She said that, as part of this, the EnviroTech Center was forming cooperative relationships to exchange innovative technologies with a group in New Jersey. She said she thinks that Congressman Studds, who started the EnviroTech Center, would be very happy to see what they are doing. Mr. Cambareri stated that he was concerned about the role, and how much of an advocate they would be or what partisan position the center would take. Ms. Smith said that may be a question on everyone's mind, but that a lot of people were involved in the evaluation of the innovative technology, so it takes a lot of people to make a successful team.

Mr. Schlesinger asked if EnviroTech's mission was community involvement. Ms. Smith replied no, that as she had stated earlier, one of their missions was to advocate innovative technology and that the EnviroTech Center's main mission was to identify, investigate, review, demonstrate and hopefully commercialize innovative technology. She stated that they had just completed a project for AFCEE for optimization demonstration software for pump and treat systems and was working on a business plan to commercialize that software.

Mr. Schlesinger asked if the EnviroTech Center was the community involvement arm for the NGB. Ms. Smith replied yes.

Mr. Hugus commented that he had to get the NGB's proposal for public involvement by special request and it was not really distributed, although he did not know why. He stated that if they were concerned about community involvement, you would think that it would have been distributed. LTC Knott stated that it was supposed to be distributed to all the IART members.

**Agenda Item #4: JPO's Upper Cape Water Supply Program Modeling Efforts  
(See attachment #4)**

Mr. Goydas from Jacobs Engineering said he would present an overview of the modeling conducted to evaluate and come up with candidate well sites on MMR for field testing. He gave a short summary for those who were not familiar with the AFCEE IRP activities. He said Jacobs has conducted quite a bit of groundwater modeling at this site, most of which has been for site characterization to identify where some of the contamination resides in the aquifer, obviously for remedial design, and to assess the interaction of plumes with surface water in Ashumet Pond and Johns Pond to assess potential ecological risk. He said that tonight he would talk about water supply, trying to identify the most probable or optimal locations within the aquifer for field testing for well sites. Mr. Goydas noted that modeling fit with this application for several reasons. He explained that there were a couple of reasons, one being that Jacobs has immense knowledge of known contamination at the site, and in addition, a lot of money has been spent on remedial systems for some of the plumes. Specifically the plumes we are most interested in in this activity are LF-1

and FS-12 because they reside close to the areas we are looking at for potential water supplies. Mr. Goydas added that some of the other reasons for performing the modeling were that the modeling allows assessment and quantification of ground- and surface-water interactions -- how one well may impact another well, how a well may draw contamination in, or assess changes in the flow rate so it may have a detrimental impact on the remedial system. Mr. Goydas said that the modeling allows Jacobs to do this very quickly, and allows them to assess multiple scenarios, and multiple constraints or goals in a relatively quick and quantifiable way.

Mr. Goydas pointed out the area being looked at on the map. He noted that most of the IART was aware of the site, and that the site was located at the top of a groundwater mound with three or four major different topographical geologic units. He identified them as the Mashpee pitted plain, the Sandwich Moraine to the northeast, and the Buzzards Bay moraine to the west. He explained that Jacobs was looking at trying to place wells within the MMR boundary, and the work they are conducting is trying to identify the optimal locations within the MMR.

Mr. Goydas stated that he would next review the process for locating the site. He said that Jacobs' first task had been compiling, evaluating and reviewing the previous work, including work by Earth Tech, the U.S. Geological Survey (USGS) and Metcalf & Eddy to try and get an understanding of the basis of the shortfall assessment and try to understand the inputs to that thought process. He went on to say that following that, Jacobs met with the Impact Area people to understand what the current state of knowledge was and received data in both map and electronic formats to update Jacobs' conceptual understanding of contaminant distribution in the Impact Area.

Mr. Goydas reported that the next step was revision of the three plume shells, which really pertained to the AFCEE IRP plumes south of the Impact Area. He stated that these plumes had true mappable detections and identifiable plume outlines. He said that Jacobs updated the outlines and three-dimensional plume representations. He went on to say Jacobs wanted to identify the most probable contaminant source areas, because they may or may not ultimately contribute to groundwater contamination. He explained that Jacobs looked at soils that had been collected and the distribution of potential source areas relative to contamination, and matched them up with some potential source areas to qualitatively identify both those areas we want to stay away from and those areas that look promising in terms of well placement.

Mr. Goydas noted that the next step was to reevaluate the current pumping regime. He stated that it had been a while since pumping had been assessed in terms of what was ongoing. He reported that he received state records for the years 1996-1999, and that Jacobs had also assimilated and compiled pumping rates. Jacobs had also created a questionnaire, which was distributed to the local water superintendents, requesting information on the correctness of assumptions and underlying data and asking if, in their opinion, Jacobs had missed something. He said that an example would be if the water superintendents were planning to put in a well and Jacobs had no knowledge of it. Mr. Goydas stated that Jacobs received that information and built it into the groundwater flow model.

He reported that Jacobs' next effort was to try to establish or project what the future pumping rates would be. He explained that the reason this is key is because the remedial systems will be operating for at least the next five to ten years and that Jacobs wanted to make sure the increased pumping would not have an impact on the remedial systems. Mr. Goydas said that Jacobs looked at the previous work conducted by the previously mentioned contractors and came up with several scenarios. The scenarios were based on what they thought was the best or most likely 2020 pumping rate to use in the model to assess how the flow regime may change, how our wells may or may not impact that future flow regime, and whether or not placement of our wells would impact other remedial systems.

Mr. Goydas noted that Jacobs next performed particle tracking. He explained that particle tracking was tracking where a zone, bundle or particle of water would migrate, either backtracking from a well or forward tracking away from a well. He stated that Jacobs did that to identify zones of both contaminated or potentially contaminated water and zones that were likely clean water. Mr. Goydas reported that when

Jacobs identified clean zones they identified wells that were clean, and the process was to identify one or two wells that were clean in the same flow path, which were then particle-tracked from those wells and a clean swath of water identified. He said that the same process had been performed for those wells that are contaminated.

Mr. Goydas commented that Jacobs had also wanted to look at potentially impacted soil areas. He explained that in those areas Jacobs took a very conservative approach and said that possibly in the future some of the soil contamination may leach to groundwater and may be a source of groundwater contamination. He said that next they identified swaths in the aquifer that may have the potential to be impacted.

Mr. Goydas reported that the next step was testing, and wells were placed in the model to see how the wells would either pull contamination in, affect remedial systems, or change the trajectory of identified contamination. Also examined was how the zones of contribution areas would underflow or be in the path of a potential source area. Mr. Goydas said that they then evaluated the goals, trying to make sure that they missed contamination and minimized impact on the current remedial systems, which was a primary consideration.

Mr. Goydas added that the wells had a series of secondary goals which included, for example, ease of access and proximity of wells to one another, in addition to potential interference with other zones of contribution (ZOCs) and detectable contaminants, rather than mappable exceedences.

Mr. Goydas said that, lastly, Jacobs identified optimal locations for field testing. He reported that this was not the end point, but a very proactive step in trying to reduce the uncertainty in well siting. He said that the next step would be for Jacobs to perform aquifer pumping tests and characterization of the field wells that had been installed for input into the resource approval process.

Mr. Goydas stated that the primary goals were avoiding impacts to the known plumes, trying to minimize potential capture of impacted water in the Impact Area, trying to avoid known source areas, trying to identify and place wells in the highest transmissivity and conductivity zones where they are likely to have high yield, and also minimizing impacts to potential ecological receptors. There are several ponds in the area, and we don't want to have a detrimental impact on the ponds but want to minimize impact on the general flow regimes. He explained that change in the flow regime, especially in this area, have relatively potentially more impact than one of the existing plumes, especially the FS-12 plume and the LF-1 plume. Mr. Goydas went on to say that Jacobs wanted to minimize the impact of the trajectory of the known plume paths, specifically those that are not being remediated. For example, Jacobs did a lot of particle tracking from existing wells where there are detections. He explained that Jacobs did not want to change a trajectory that would go off to the northwest and pull contamination into currently clean water - we did not want to impact currently clean water.

Mr. Goydas next displayed a map of the ZOCs in 2000. He explained that the ZOCs were simply where the water resides or comes from for these particular wells. Mr. Goydas reported that this same graphic was used at the SMB meeting. He added that after that time, there was some constructability issues regarding placement and trying to avoid ecological impacts. He said that the wells had been slightly moved, but that the graphic represented where the water would come from and where the wells would be placed based on 2000 conditions, which was the current operating performance of each of the surrounding towns. He said that it represents all the pumping that occurs, including the Bourne, Sandwich, Mashpee and Falmouth wells and the proposed wells pumping at a total of 3.75 million gallons per day (mgd), or approximately .75 mgd per well.

Mr. Goydas noted that the next map was a ground map and that Jacobs does a lot of sensitivity work to get a feel for what type of flows we have to have before there are potential changes in real flow regime or impacts to some of the ponds. He noted that the map illustrated drawdowns, the difference between the

stacked well level without pumping to the low-level drawdown due to pumping at the lower rate at year 2000 conditions.

Mr. Goydas then displayed a 2020 water table map and noted that Jacobs had assessed impacts on the water table based on a series of different pumping rates, from .50 mgd to 5 mgd for the total system. He reported that the wells are placed so that they do not change the flow regime and are not believed to have an impact on remedial systems or to change the trajectory of the known or identified contamination. He added that the wells would not significantly impact water bodies. Mr. Goydas stated that Jacobs went through a detailed assessment of what the likely changes would be in terms of pond flux for Shawmee Pond, or the amount of water that naturally flows through a pond, and the approximations were a 2% to 12% change at Shawmee Pond. Mr. Goydas stated that he did not believe these wells would have a detrimental environmental impact, and that Jacobs believes that they are away from the identified contamination of the Impact Area wells. They also tried to place them such that they were not competing with potential source zone areas.

Mr. Goydas reported that the next slide was an aerial photograph, and pointed out the locations of the proposed wells on the slide. He added that Jacobs tested a lot of the old Long Range Water Supply wells and the Metcalf & Eddy well locations, which fell out for a number of reasons. He explained that some of those wells were either immediately downgradient of impacted wells, in some cases there was significant impact on Shawmee Pond, or some ZOCs went through a potential source area.

Mr. Schlesinger asked if Mr. Goydas had stated that the .75 mgd would have a 2% to 12% impact on upper Shawmee Pond. Mr. Goydas replied that at the higher flow rate of 5 mgd, the maximum potential change in flux to the pond is about 13%. He added that must be caveated with the fact that we still are conducting the pumping tests and collecting the true field data to roll back into the model and refine our understanding. Mr. Goydas stated that Jacobs thinks this is a significant overrepresentation because Jacobs is simulating less water moving through the pond than what actually occurs. He explained that Jacobs knows how it comes out on the discharge side, but was under-predicting how much water moves into the pond, therefore we are over-predicting the amount of change in flux. Mr. Schlesinger said that essentially Mr. Goydas was saying they were conservative. Mr. Goydas replied that, with regard to changes in pond elevation and flux, Jacobs was acting conservatively.

Mr. Cambareri thanked Mr. Goydas for the overview and asked when the IART could expect a more technical presentation of the steps and methodology Jacobs went through. Mr. Goydas replied that Jacobs was preparing a report, which would be out within the next two weeks. He noted that due to time constraints, his presentation had been synopsisized and that Jacobs had done a more complete presentation several months ago to the EPA, MA DEP and USGS, which he was willing to do again if requested.

Mr. Cambareri asked if test wells were currently being drilled. Mr. Gonser said yes. Mr. Cambareri commented that, as part of the Environmental Review Form (ENF) environmental review, these wells would be turned over to the water supply cooperative once the legislation passes, and they would eventually become community systems. He added that he looks forward to finding out more about the project.

Mr. Dow commented that one of the slides shows that there seems to be a quite a drawdown around WS-4. He asked if Jacobs had run scenarios that did not have equal pumping at all five wells, and whether some pumped at higher rates and if all of this equalized out drawdown problems which also affected WS-3 and ponds to the north. Mr. Goydas replied yes, that Jacobs had done about sixty simulations. He explained that Jacobs had started with some of the old water supply wells, tested those and started to take a geographic look to the south, east, north and west. He added that Jacobs looked at a combination of wells to balance the flow regime, and did look at different pumping rates at different wells. Mr. Goydas stated that if you look at the drawdown at the wells, one must realize that the drawdown at the wells will be different from drawdown at a distance and how it propagates at the pond. He added that they also looked at placement of the screen, the length of the screen, changes in recharge rates and changes in productivity

related to drawdown. He said Jacobs did this to get a feel for what the range of uncertainty was and where they thought they were.

Mr. Dow asked if the optimum solution was to pump equally at all five wells to get the 5 mgd. Mr. Goydas replied that all the locations were pumped at a total of up to 5 mgd but that you can pump different flow rates from the five wells. He said that what Jacobs was trying to do was come up with the best locations and that these just happened to be tested at 1 mgd and .75 mgd or less mgd per well and that, yes, you can pump different pumping rates at each of the wells within reason. Mr. Goydas explained that the uncertainty would be reduced after the pump test data comes back.

Mr. Dow asked if Jacobs' focus had been more on the total rates than on the pumping rates for each individual well. Mr. Goydas answered that Jacobs' focus had been on meeting the primary criteria of not changing a plume, not pulling in contamination, minimizing potential for a contributing area by a source area and to minimize, negate or have no impact on remedial systems. He added that there had been less focus on whether or not one well pumped at 10 mgd and another one pumped at 8 mgd, but that obviously had been evaluated through the various scenarios tested.

Mr. Schlesinger asked how Jacobs determined how much water was moving through Shawmee Pond. Mr. Goydas explained that there were two components to the amount of water moving through Shawmee Pond; one is the groundwater flux which discharges to the pond and then potentially leaves the pond and goes back into the aquifer, and then there is the water that leaves through the stream discharge. Mr. Goydas said that to model those, Jacobs used a 3D Flux Interpreter which calculates the amount of flux across each cell that leaves the aquifer and goes into the pond and then goes out of the pond back into the aquifer. It calculates, through a series of equations, how much water is going in and how much water is going out. He added that, in reality, we don't have a good understanding or feel for that information, but we do not really need to because we know generally how much water is leaving the pond through stream discharge, which was probably a fairly sizeable portion of the total discharge. Mr. Goydas said that Jacobs is pumping a very small fraction of the water that discharges through the pond and the amount of water that discharges out to the stream. He went on to say that Jacobs had looked at where the water for Shawmee Pond comes from and where the water from all the wells drilled go to, and that it was a relatively small component of all the water that normally flows through Shawmee Pond.

Mr. Schlesinger asked what kind of time-step Jacobs was using and if it were a 10- or 20-year average. He explained that there have been some really low years. Mr. Goydas replied that Jacobs was using a full 10-year record, which he thinks was pretty representative, especially considering that most of the technical folks would say that the year 1993, what we called the average, was a fair representation of average conditions. He stated that he thought that the time-span was a good representation of what's going on in the pond.

Ms. Frawley noted that it was now 9:55 PM and proposed that the additional agenda items be postponed to the next meeting.

LTC Knott then quickly summarized some information on the detonation chamber. He said that the detonation chamber will be moved to the Cape shortly and reported that there would be a meeting next Thursday to discuss permitting requirements..... UNINTELLIGIBLE.

Mr. Schlesinger asked about the UXO disposal that will be required by the RRA. LTC Knott replied that .... UNINTELLIGIBLE.

**Agenda Item #5. Wrap Up, Schedule Next Meeting, Review Action Items*****Wrap Up, Schedule Next Meeting***

Ms. Frawley stated the next meeting date would be April 5, 2000 and said she would type up the action items and e-mail or mail them to the members to save time.

***Action Items:***

1. MA ARNG agreed to provide and share with the IART a written inventory of the number and types of items remaining in the ASP.
2. It was agreed to discuss, at the next technical meeting, inclusion of a Greenway Road high-use/frequent-use range in the Small Arms Sampling Plan.
3. NGB/MA ARNG agreed to provide a written response, for inclusion in the weekly technical report, to Mr. Zanis' request that the active ranges on Greenway Road be moved away from nearby residential areas. They will also identify who was using the range near the Forestdale school the weekend of February 27-28, 2000.
4. Mr. Hugus requested that NGB check its maintenance records and report to the IART on all munitions cleanup activities that have occurred outside of the official Impact Area Study.
5. It was requested, that the technical team revisit the number of Demo Area 1 response wells located near the southern part of the plume, based on the recent profile sampling results from MW75, MW76 and MW77.
6. It was requested that MAANG conduct a record review of the history of use for Mortar Target 9 and report its findings to the IART.
7. Dr. Feigenbaum requested that the technical team discuss the adequacy of the characterization of the Mortar Targets area of contamination.
8. Dr. Feigenbaum noted that the unit of concentration and MCL for 1,2,-Dibromoethane was incorrect in the 2/2/00 VOC detection table (page 2) for Well Number ECMWSNP02. A written discussion of the MCL/HA exceedence at this IAR well in the Snake Pond area will be included in a weekly report.

***Adjourn:***

Ms. Frawley adjourned the meeting at 10:00 PM.